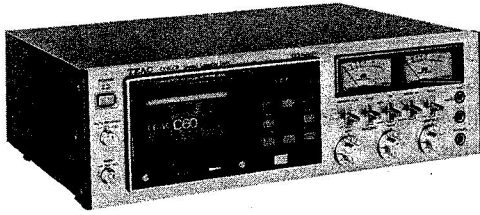


TEAC®



SERVICE MANUAL

CX-650R

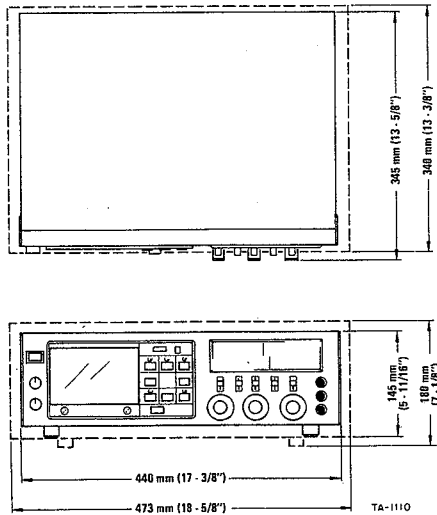
Stereo Cassette Deck

1 SPECIFICATIONS AND SERVICE DATA

SPECIFICATIONS

Track System 4-track, 2-channel stereo
Heads 2 Erase, Record/Playback
Type of Tape Cassette tape, C-60 and C-90 (Philips type)
Tape Speed 4.8 cm/s (1-7/8 ips)
Input (level and impedance)
MIC: Specified input level; -57dB (1.09mV)/10kohms
Min. input level; -67dB (346μV)
LINE IN: Specified input level; -9dB (275mV)/50kohms
Min. input level; -19dB (86.9mV)
DIN*: Min. input level; -35dB (13.8mV)
* Pursuant to DIN standards
Outputs (level and load impedance)
OUTPUT: Specified output level; -5dB (436mV)/50kohms
Max. output level; -2.5dB (581mV)
Headphones: Specified output level; -15dB (138mV) 8 ohms
Equalization
METAL & CO (CrO₂): 3180μs + 70μs
NORMAL: 3180μs + 120μs
Head Configuration
1/2-track, 1-channel Erase Head (2 used)
1/4-track, 2-channel record/playback head
Motor 2 used: 1 FG Servo Controlled DC Capstan Motor, 1 DC
Coreless Reel Motor
Bias Frequency 100kHz
Operation Position Horizontal
Power Requirements
100/117/220/240V AC, 50/60Hz, 39W (General Export Model)
117V AC, 60Hz, 39W (U.S.A./Canada Model)
220V AC, 50Hz, 39W (Europe Model)
240V AC, 50Hz, 39W (U.K./Australia Model)
Weight 11.5kg (25.3 lbs.) net
13.2kg (29.1 lbs.) net (Some General Exp. models have
wood case.)

Dimensions



Broken line indicates some General Export models.

Fig. 1-1

SERVICE DATA

MECHANICAL

Tape Speed Deviation 3,000Hz ±45Hz
Tape Speed Drift 30Hz
FWD/REV Differential 30Hz (Reference)
Wow and Flutter
Playback: 0.10% (WRMS)
0.15% (RMS)
Record/Playback: 0.28% (RMS)
Pinch Roller Pressure 400g ~ 500g (14.1oz. ~ 17.6oz.)
Reel Torque
Take-up: 45 ~ 65 g-cm (0.62 ~ 0.90 oz-inch)
Supply: 3 ~ 4 g-cm (0.042 ~ 0.056 oz-inch)
F.F./REW: 90 ~ 160 g-cm (1.2 ~ 2.2 oz-inch)
Rewind/Fast Forward Time
85 seconds or less for MTT-501 (C-60)

ELECTRICAL

Frequency Response

Playback	Co(CrO ₂)/	40Hz	±3dB
	METAL,	63Hz ~ 6.3kHz	±2dB
Overall		10kHz	±3dB
		40Hz	+2, -4dB
		125Hz ~ 6.3kHz	±2dB
		10kHz	±3dB (NORMAL)
		12.5kHz	+3, -4dB (Co(CrO ₂)/METAL)

Signal-to-noise Ratio

Playback NORMAL, 48dB min.
Overall METAL/Co(CrO₂), 48dB min.
NORMAL, 46dB min.
S/N is improved by 5dB at 1kHz and 10dB above 5kHz
when Dolby NR* is used.
Erase Efficiency 65dB min. at 1kHz (measured with input 10dB
higher than the specified input level)
Channel Separation 30dB min. at 1kHz
Adjacent Track Crosstalk 40dB min. at 125Hz
Total Harmonic Distortion 2.0% or less with 3 types of tapes

NOTES:

- Improvements may result in Specifications and Service Data changes.
- Value of "dB" in the Data refers to 0dB (0.775V), except where specified.

*Noise reduction circuit made under license from Dolby Laboratories. The word "Dolby" and the Double-D symbol are trademarks of Dolby Laboratories.

CAUTION

⚠ Parts marked with this sign are safety critical components. They must always be replaced with identical components - refer to the TEAC Parts List and ensure exact replacement.

2 PARTS LOCATION

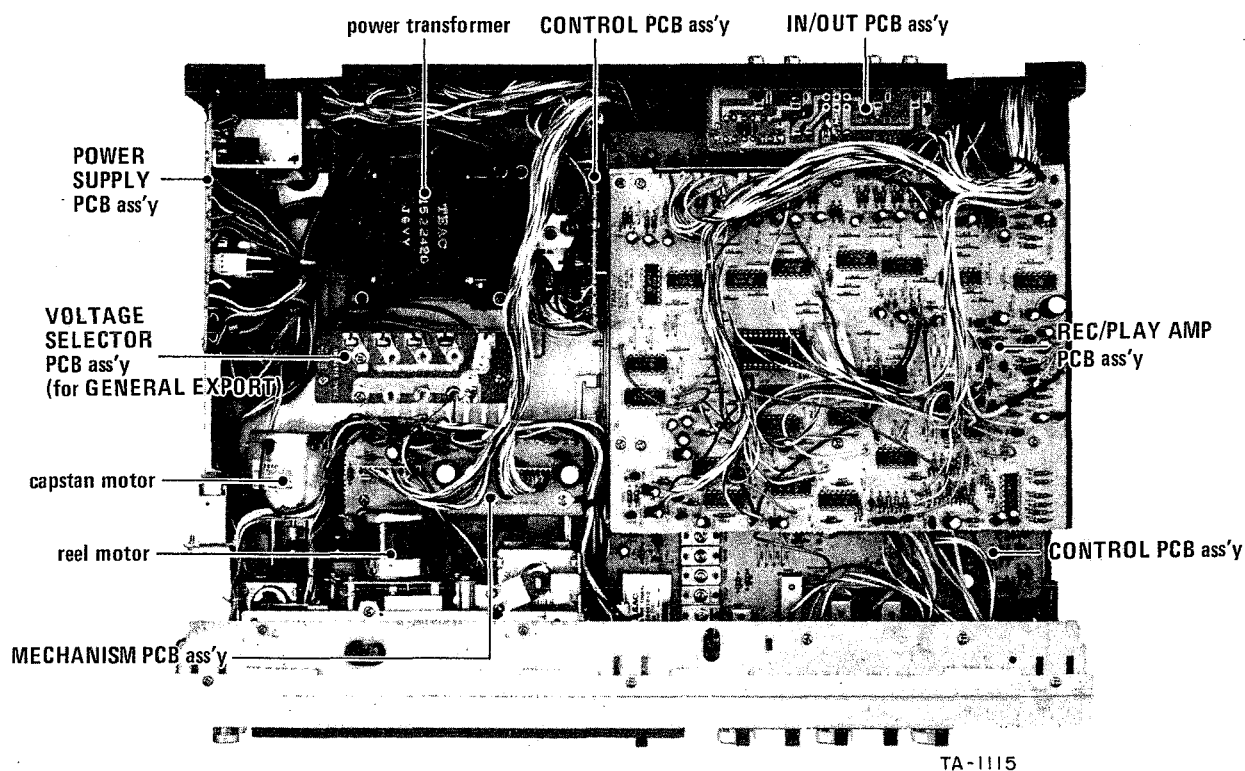


Fig. 2-1

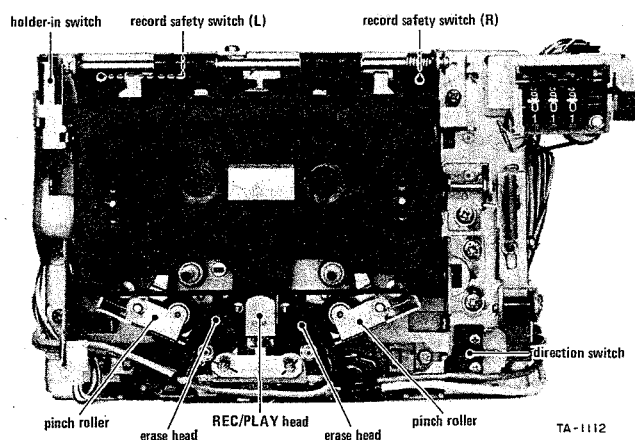


Fig. 2-2

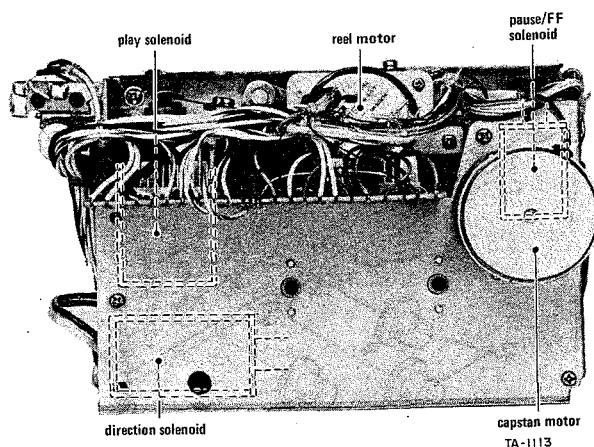
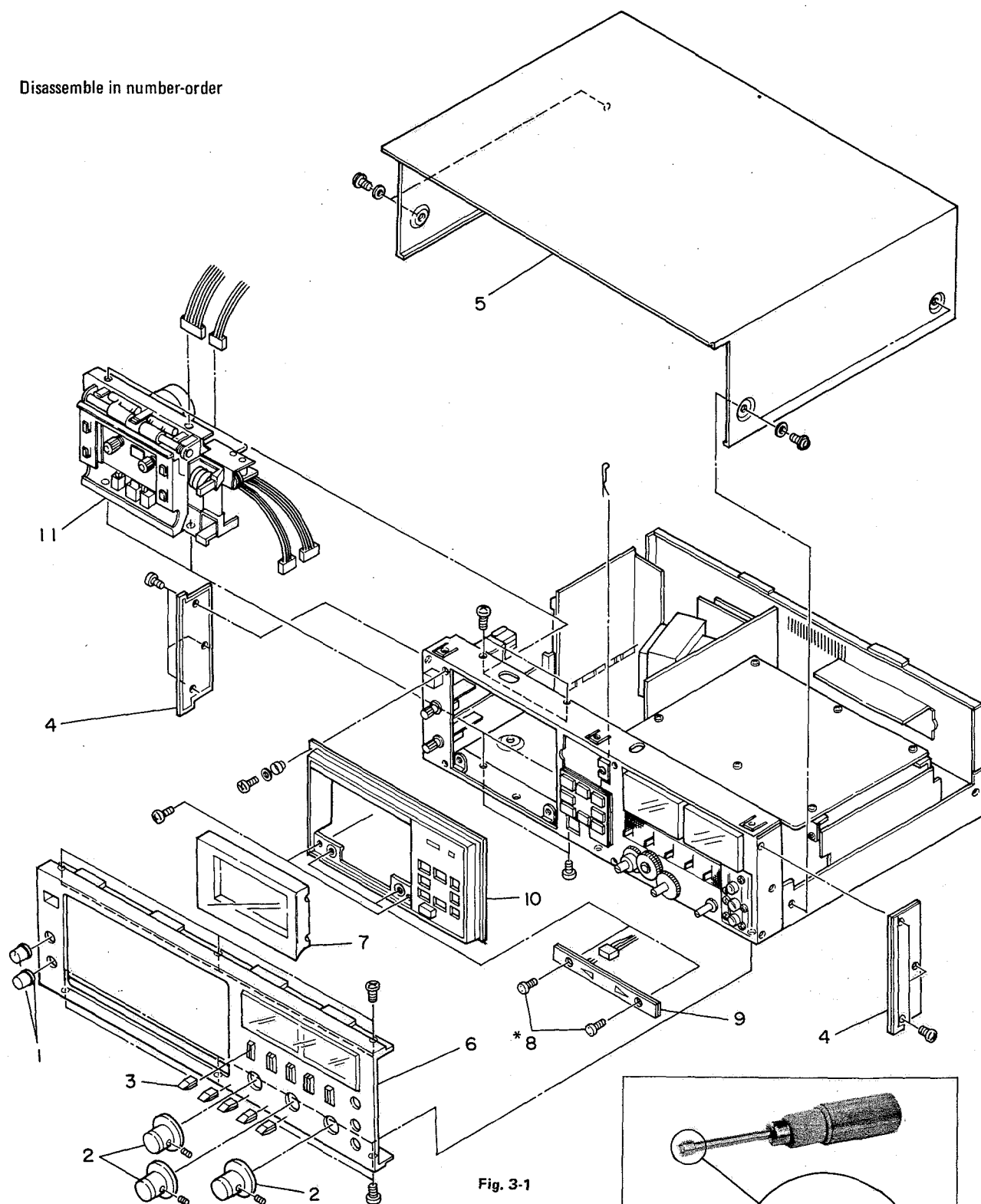


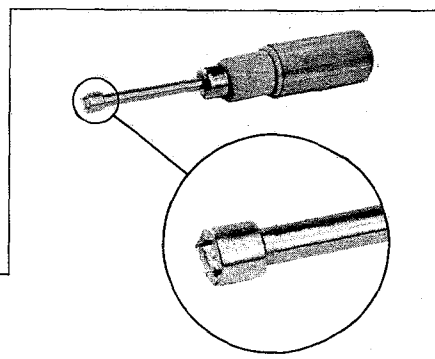
Fig. 2-3

3 CAGE AND FRONT PANEL REMOVAL

Disassemble in number-order



NOTE: A crab-eye driver is required to remove the "crab-eyes" screws (* marked).



4 MECHANICAL ADJUSTMENTS AND CHECKS

4-1 PLAY SOLENOID POSITION (See Fig. 2-3).

1. Manually push the head base plate ass'y upwards until it touches the head base stopper.
2. With the above condition, adjust the solenoid position in order that the plunger projects from the solenoid housing as shown.

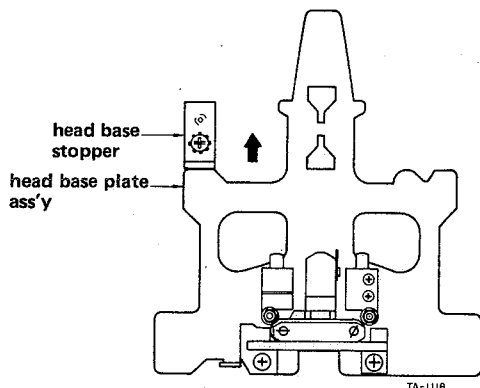


Fig. 4-1

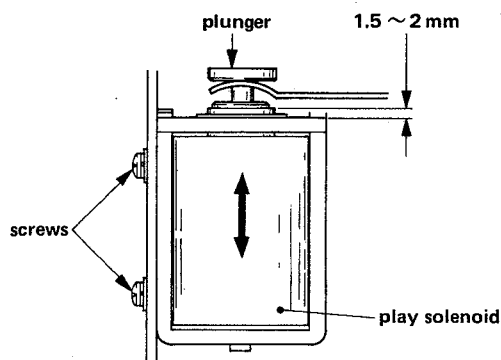


Fig. 4-2

4-2 RECORD SAFETY SWITCH POSITION (See Fig. 2-2)

1. Load a cassette with both record tabs of sides A and B attached.
2. Check that when depressing the RECORD button, the RECORD indicator lamp lights and that simultaneously both play indicator lamps flash on and off.
3. Load a cassette with both record tabs removed.
4. Check that when pushing the RECORD button, the RECORD and both play indicator lamps do not light.
5. If there is any mal-function, correct by re-positioning the record safety switches, (left and/or right).

4-3 HOLDER-IN SWITCH POSITION (See Fig. 2-2)

1. Check that when inserting a cassette tape in the cassette holder and closing it, all operations of the control panel buttons can be done.
2. Check that when cassette holder is opened, operation of any control panel button is impossible.
3. If this requirement is not obtained, correct by adjusting the holder in switch position.

4-4 DIRECTION SWITCH POSITION (See Fig. 2-2)

1. Load any cassette.
2. Check that when in forward (reverse) play operation, right (left) DIRECTION lamp lights up.
3. Adjustment can be made by positioning of the direction switch.

4-5 PINCH ROLLER PRESSURE

NOTE: The explanation below applies to both left and right pinch rollers.

1. Place in the play mode with no tape loaded.
2. Attach a spring scale to the pinch roller shaft.
3. Draw the pinch roller away from the capstan shaft in the direction shown by the arrow until the capstan shaft and the pinch roller are separated.
4. Return the scale back until the pinch roller just begins to rotate. The scale should then be reading as per specifications.
Specification: 400g ~ 500g (14.1oz ~ 17.6oz)
5. If the reading is out of the specified range, replace the pinch roller ass'y or the pinch roller spring.

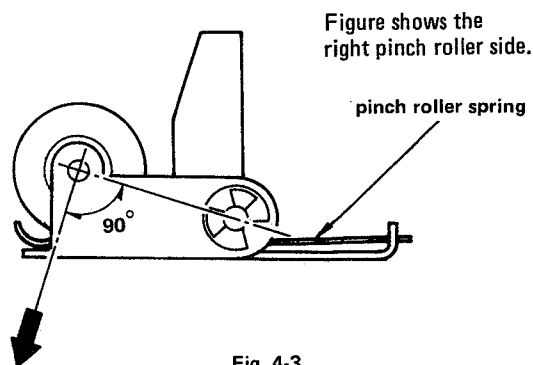


Fig. 4-3

4-6 REEL TORQUE

1. Load a cassette torque meter and read the pointer indication on the dial scale for each tape movement operation.
Specifications:
Take-up (in FWD/REV): 45 ~ 65 g.cm (0.62 ~ 0.90oz. inch)
Supply ("): 3 ~ 4 g.cm (0.042 ~ 0.056oz. inch) (adjustable)
Fast forward & Rewind: 90 ~ 160 g.cm (1.2 ~ 2.2oz. inch)
2. If supply torque adjustment is required, adjust by turning the supply torque adj. nuts.

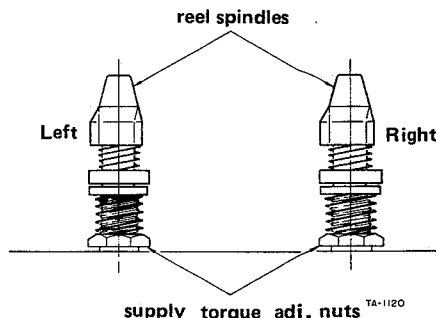


Fig. 4-4

4-7 TAPE SPEED

NOTE: The following checks should be done by both forward and reverse play operations.

1. Connect test equipment to the deck.
2. Load and play a TEAC MTT-111 test tape.
3. Using a common slotted screwdriver with a handle completely insulated from the screwdriver blade, adjust the control on the motor for a reading of $3,005 \pm 5$ Hz.

NOTE: This tape speed setting should be done after about 20 seconds of operating time.

4. Check the following at any portion of the tape run.

Specifications:

Tape speed deviation (in FWD/REV) . . . $3,000 \text{ Hz} \pm 45 \text{ Hz}$

Tape speed drift ("") 30 Hz

FWD/REV differential 30 Hz or less
(reference value)

5. If the tape speed is out of spec., check the pinch roller pressure and the tape driving function for correctness, and make sure the tape path is clean.

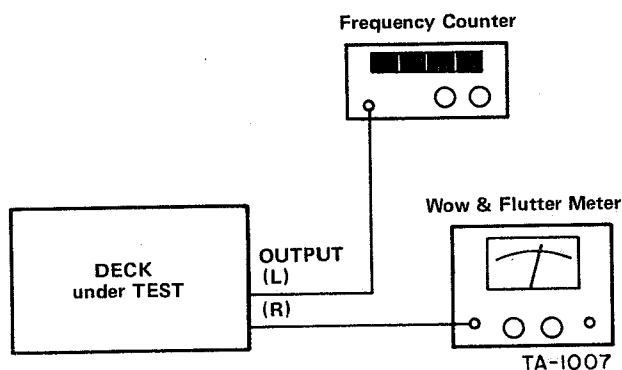


Fig. 4-5

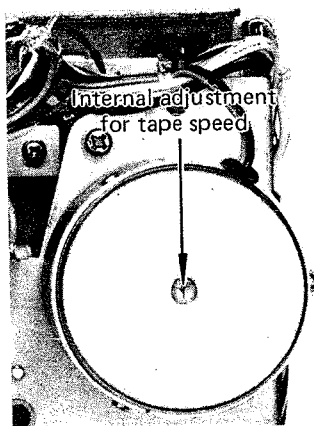


Fig. 4-6

4-8 TAPE PATH ALIGNMENT

1. Connect the deck to test equipment as shown.
2. Open the cassette holder.
3. Insert the check base plate jig into the cassette holder very carefully. When doing this, hold the jig in place until its bottom edge sit on the stopper at the bottom of the cassette holder.
4. Having closed the cassette holder, firmly press down the plate jig.
5. Set in the play mode.
6. Using the height jig, adjust both left and right erase head's guide heights by turning each erase head height adj. nut. When doing this observe NOTES below.

NOTES: 1. The final turn of the nut is in the clockwise direction. Do so for all subsequent adjustments of nuts and screws.

2. Pay special attention not to over-tighten the nut since the erase head guide is flexible.

7. By use of the height jig, adjust the REC/PLAY head's guide height in both forward and reverse play modes by turning each azimuth adj. screw.
8. Load and play a TEAC MTT-111 test tape.
9. Turn each azimuth adj. screw so that the phase relationship between L- and R-ch signals in both forward and reverse modes is as near as possible to 0 degrees. Check with an oscilloscope. Then make sure that the play-back output level of both channels is the maximum value.
10. Load a mirror-type cassette* (C-90) and check tape movement condition at REC/PLAY head's guide in both forward and reverse play modes.

* Ones made by TEAC are referred to as "Compact Cassette Tape Path Checker" and classified into 2 types: MTT-901 (C-60, 30 m) and MTT-902 (C-90, 45 m)

11. If there is tape curling at upper (lower) edge of the guide in both play modes, insert (extract) Support Spacer/s as shown to remove this phenomenon.
12. If tape curling appears at upper (lower) edge in forward mode, besides at lower (upper) edge in reverse mode, repair by adding (subtracting) Head Spacer/s.
13. Load and play a TEAC MTT-111 test tape again and re-adjust phase relationship by each azimuth adj. screw.
14. Load again a C-90, mirror-type cassette and check to see whether there is no tape curling at REC/PLAY head's guide in both play mode. At the same time, check that tape moves nearly in the center of erase head's tape travel surface.

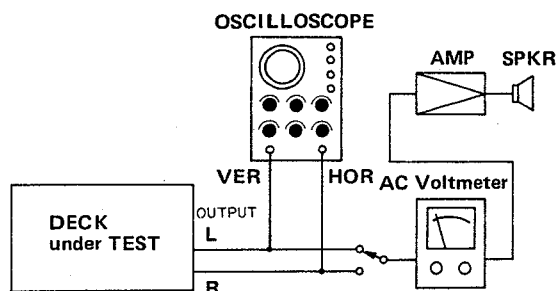
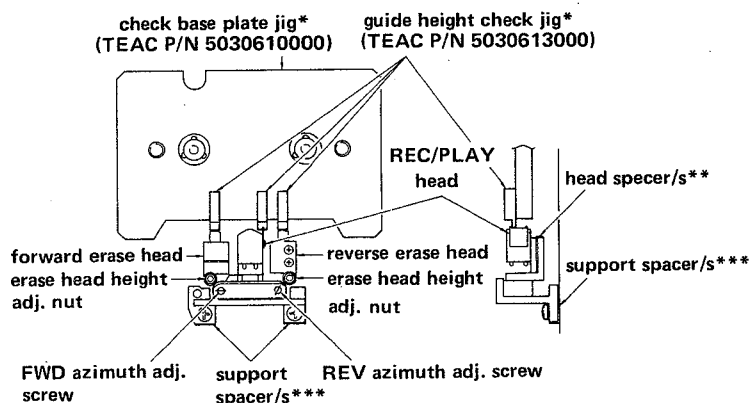


Fig. 4-7



- * These jigs are the ones used for C-1, C-2 and A-800.
- ** Head Spacer
 - A: thickness = 0.1mm, TEAC P/N 5800019200
 - B: thickness = 0.2mm, TEAC P/N 5800019300
 - Auxiliary: thickness = 0.06mm, TEAC P/N 5800022200
- *** Support Spacer
 - Main: thickness = 0.2mm, TEAC P/N 5800003900
 - Auxiliary: thickness = 0.1mm, TEAC P/N 5800022100

Fig. 4-8

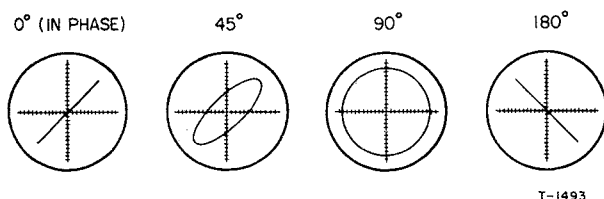


Fig. 4-9 Confirming Phase Relationship

4-9 LUBRICATION

Lubrication is only required when parts are replaced. For this purpose, use oil and grease specified below.

Oil: TEAC spindle oil (from TEAC TZ-255 oil kit), Mobil D.T.E. Oil Light, or equivalent

Grease: ORE-LUBE G1/3 or equivalent

1. Apply a drop of oil with an oil applicator to a point about 1/3 the way down the shaft (from the free end) of the flywheels, then insert the shafts into the capstan housings.
2. Apply a suitable amount of light grease to the well of the flywheel bearings.

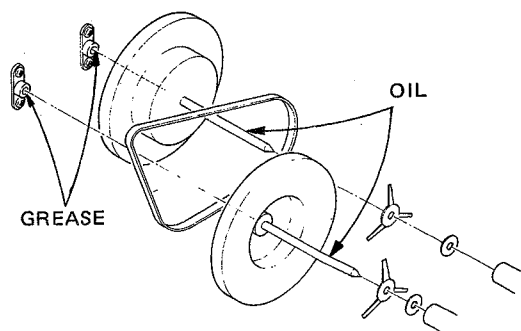


Fig. 4-10

4-10 VOLTAGE CONVERSION (FOR GENERAL EXPORT MODELS)

1. Always disconnect the power line cord before making these adjustments.
2. Remove the top cover of the deck by removing the screws from the sides.
3. Locate the voltage selector, shown in the illustration, to the front of the power transformer.
4. Loosen the two screws in the shorting bar and move the bar so that it shorts across the terminals marked with the required voltage (100, 117, 220 or 240).
5. Retighten the screws.
6. Replace the top cover.*

* Decks sold in some limited areas only have a wooden case which must be removed by the screws on the bottom of the deck before setting the voltage selector.

NOTE: For cassette deck models with DC capstan and reel motors, no modification is required for changes of power line frequency from 60 Hz to 50 Hz and vice versa.

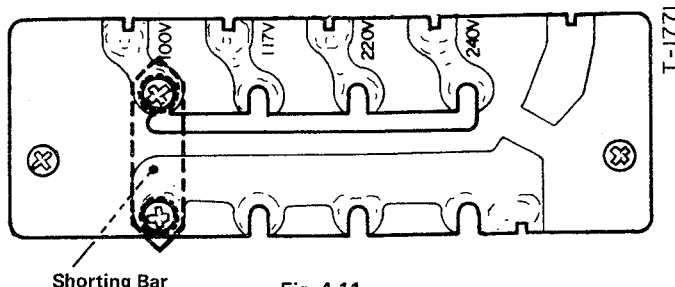


Fig. 4-11

5 ELECTRICAL ADJUSTMENTS AND CHECKS

PRECAUTIONS

1. Before performing adjustments and checks, clean and demagnetize the entire tape path.
2. Make sure the deck is properly set for the voltage in your locality.
3. In general, adjustments and checks are done in the order of L-ch then R-ch. Double REF. Nos. indicate L-ch/R-ch. (Example: R15/R25)
4. The value of "dB" refers to 0 dB (0.775 V). If an AC voltmeter calibrated to 0 dB (1 V) is to be used, appropriate compensation should be made.
5. The AC voltmeter used in the procedures must have an input impedance of 1 M-ohms or more.
6. Note the "Deck settings" at the top of each chart. The settings must be used for all the checks on the chart unless explicitly stated otherwise.
7. The direction of tape movement is FORWARD (unless specially stated otherwise) in all the checks.

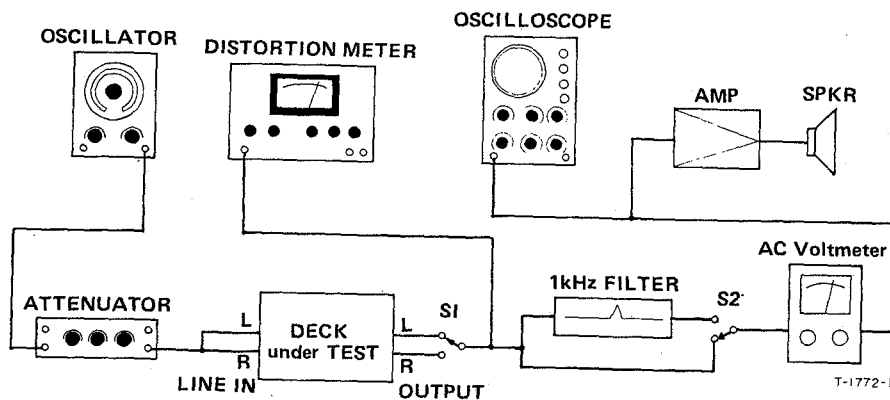


Fig. 5-1 Basic test setup

5-1 POWER SUPPLY PCB ADJUSTMENT

1. Adjust R809 for +23 V DC at terminal 11 on the PCB to GND.

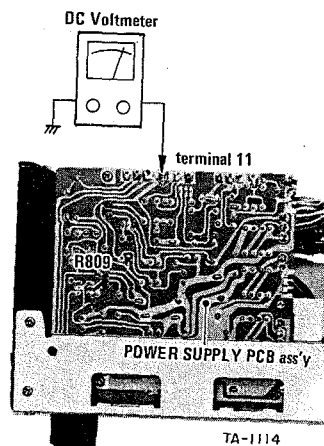


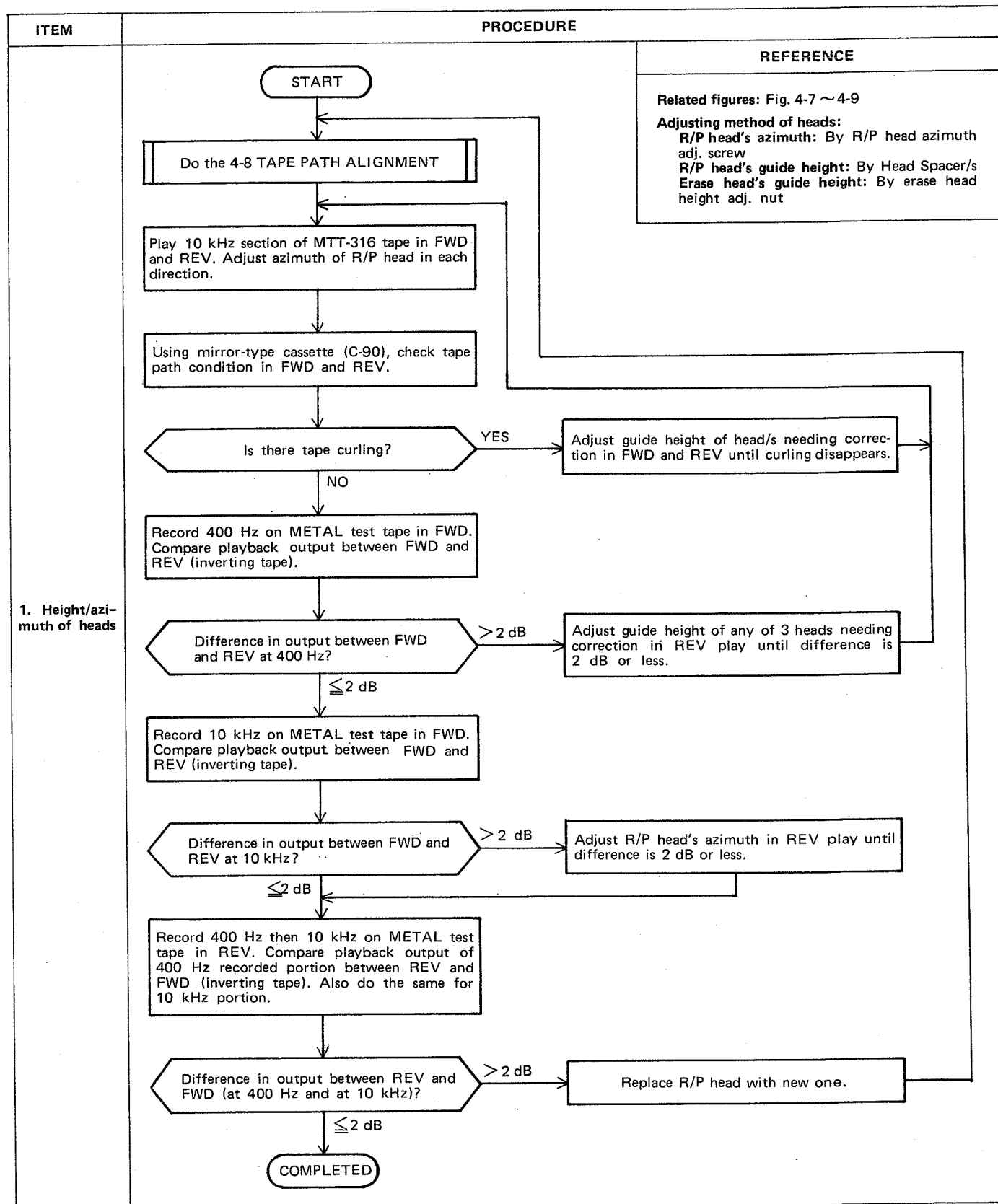
Fig. 5-2

5-2 PLAYBACK PERFORMANCE

Deck settings:
 BIAS SW. — METAL
 EQ SW. — METAL
 DOLBY NR SW. — OUT
 INPUT SW. — LINE

TEAC test tapes:

MTT-150: For Dolby level calibration
 MTT-316: For playback frequency response check for METAL, Co (CrO₂)
 MTT-216: For playback frequency response check for NORMAL



ITEM	CONNECTION	MODE/ INSTRUCTION	SIGNAL SOURCE	ADJUST (or CHECK)	OUTPUT	REMARKS
2. Output level	VTVM between DOLBY TP (TP1 or 2) and GND	—	MTT-150	R12/R22	580mV (−2.5 dB)	
	Fig. 5-1	OUTPUT cont. — Max.	"	Check	−2.5 dB ±2 dB (461 mV ~ 731 mV)	Max. output level
	"	• Set OUTPUT cont. for a −5 dB output on the ch. with the lower reading.	"	OUTPUT cont.	−5 dB (436 mV)	• Spec. output level • Spec. setting of OUTPUT cont.
	"	• Adjust for ch. with higher reading.	"	R13 or R23	"	IMPORTANT: Do not move OUTPUT cont. during any later process.
3. Peak level meter	Fig. 5-1	OUTPUT cont. — Spec. setting	MTT-150	R15/R25	0 dB on peak level meter	
4. Frequency response	Fig. 5-1	• FWD & REV (adjust in FWD and check in REV) • OUTPUT cont. — spec. setting EQ-METAL • Adjust for 10 KHz to be the same level as ref. signal.	MTT-316	R11/R21	40 Hz ±3 dB 63 ~ 6.3k Hz ±2 dB 10k Hz ±3 dB	Ref.: 315 Hz
		EQ-NORMAL	" (10 kHz/ −20 dB)	Check	10 kHz output should be about 5 dB higher than in the step above	
5. Signal-to-noise ratio	Fig. 5-1	OUTPUT cont. — spec. setting EQ — NORMAL	Fully erased MTT-501 (Use bulk tape eraser)	Check	48 dB min. ratio	Ratio of spec. output −5 dB to noise
6. Headphone output level	Fig. 5-3	OUTPUT cont. — spec. setting	MTT-150	Check	−15 dB ±2 dB (109mV ~ 173mV)	• At phone jack • 8 ohms load

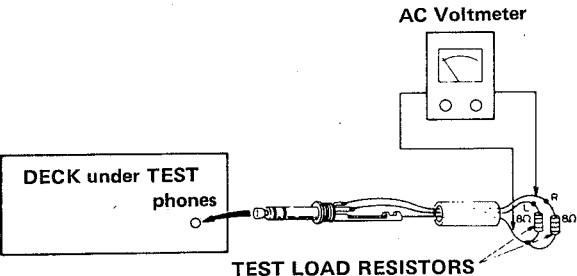


Fig. 5-3

−70 dB or more . . . What does it mean?

Values in dB are often given like this: "−70 dB or more". This sometimes leads to confusion. Is −76 dB more than −70 dB or less? To put the record straight, the "more" refers to the absolute value. The absolute value of −70 is |70|. The absolute value of −76 is |76| which is 6 more than 70. So, −76 dB is "more" than −70 dB
−55 dB is "less" than −60 dB

Deck settings:

RECORD-PAUSE mode
DOLBY NR SW. — OUT
INPUT SW. — LINE
OUTPUT cont. — Spec. setting (item 2)

5-3 MONITOR PERFORMANCE

ITEM	CONNECTION	MODE/ INSTRUCTION	SIGNAL SOURCE	ADJUST (or CHECK)	OUTPUT	REMARKS
7. Min. input level	Fig. 5-1 But, LINE IN → MIC	RECORD cont. — Max. INPUT SW. — MIC	400 Hz/—67 dB ± 3 dB (245 μ V ~ 489 μ V)	Check	—5 dB (436 mV)	NOTE: To prevent mismeasurements, any connection cords except those for each input check must be removed. MIC min. input level DIN min. input level (for Europe model only) LINE min. input level By cutting, level can be raised 3 dB
	Fig. 5-1 But, LINE IN→ DIN IN	"	400 Hz/—35 dB ± 3 dB (9.75 mV ~ 19.5 mV)	"	"	
	Fig. 5-1	INPUT SW. — LINE	400 Hz/—19 dB ± 2 dB (69.0 mV ~ 109 mV)	"	"	
	"	• If LINE input level difference between L and R is 2 dB or more, cut jumper on the lower reading ch. (See Fig. 5-4)	"	"	"	
8. Spec. RECORD cont. setting	Fig. 5-1	—	400 Hz/—9 dB (275 mV)	RECORD cont.	—5 dB (436 mV)	• Spec. LINE input level IMPORTANT: Don't move above cont's during any later process.
	OSC → ATT to LINE IN VTVM between DOLBY TP (TP1 or 2) and GND	—	"	Check	580 mV ± 1 dB (518 mV ~ 652 mV)	
9. Peak level meter	Fig. 5-1	RECORD cont. — spec. setting	400 Hz/—9 dB (275 mV)	Check	0 dB ± 1 dB on peak level meter	

Deck settings:

DOLBY NR SW. — OUT
INPUT SW. — LINE
OUTPUT cont. — Spec. setting (item 2)
RECORD cont. — Spec. setting (item 8)

TEAC test tapes:

MTT-506: For record test with Co (CrO₂)
MTT-501: For record test with NORMAL METAL tape: For record test with METAL

5-4 RECORDING PERFORMANCE

ITEM	CONNECTION	MODE/ INSTRUCTION	SIGNAL SOURCE	ADJUST (or CHECK)	OUTPUT	REMARKS
10. Bias trap	VTVM between BIAS TRAP TP (TP3 or 5) and GND	Record — pause mode	No signal record.	L104/L204	Min. reading	
11. Record bias	Fig. 5-1	METAL/METAL Co (CrO ₂)/MTT-506 NORMAL/MTT-501	400 Hz & 10 kHz alternately/—42 dB (6.15 mV)	VC101/VC201 VC102/VC202 VC103/VC203	Equal level at both freq.	
12. Record level	Fig. 5-1	METAL/METAL Co (CrO ₂)/MTT-506 NORMAL/MTT-501	400 Hz/ 12 dB (195 mV)	R18/R28 R17/R27 R16/R26	—8 dB (308 mV)	
13. Total harmonic distortion	Fig. 5-1	Same as above	400 Hz/—12 dB (195 mV)	Check	2.0% or less distortion	

ITEM	CONNECTION	MODE/ INSTRUCTION	SIGNAL SOURCE	ADJUST (or CHECK)	OUTPUT	REMARKS
14. Frequency response	Fig. 5-1	- Check with each condition. a. FWD record. → FWD playback b. FWD record. → REV playback c. REV record. → REV playback d. REV record. → FWD playback				
		METAL/METAL Co (CrO ₂)/MTT-506 NORMAL/MTT-501	Required signal/−42 dB (6.15 mV)	L101/L201 L102/L202 L103/L203	40 Hz +2, −4 dB 125~6.3k Hz ±2 dB 10k Hz ±3 dB ... 12.5k Hz +3, −4 dB	Ref.:400Hz NORMAL METAL, Co (CrO ₂)
15. Signal-to-noise ratio	Fig. 5-1	METAL/METAL Co (CrO ₂)/MTT-506 NORMAL/MTT-501	1 kHz/−9 dB (275 mV) then no signal record.	Check	48 dB min. ratio 46 dB min. ratio	Ratio of spec. output −5 dB to noise
16. Erase efficiency	Fig. 5-1 Switch on 1kHz filter	- Record 1kHz. Do "no signal" recording on a portion of above. Get output difference between 1 kHz portion and the erased portion. Do this with the following conditions: a. FWD record. → FWD erasing → FWD playback b. FWD record. → @ REV erasing → @ FWD playback c. REV record. → REV erasing → REV playback d. REV record. → @ FWD erasing → @ REV playback (@: invert the tape)				
		METAL/METAL (or Co (CrO ₂)/MTT-506)	1 kHz/+1 dB (0.869V) then erasing	Check	65 dB min. ratio	- Ref. output level: +5 dB (1.38 V) - The worst value should be within spec.
17. Record muting	Fig. 5-1 Switch on 1 kHz filter	Record 1 kHz. Then push AUTO SPACER button for several sec. Rewind and play tape. Get difference between 1 kHz portion and the created "no signal" portion.				
		METAL/METAL (or Co (CrO ₂)/MTT-506)	1 kHz/+1 dB (0.869 V) then record muting	Check	65 dB min. ratio	- Ref. output level: +5 dB (1.38 V) - The worst value should be within spec.
18. Channel separation	Fig. 5-1 But use LINE IN (L) only as input, switch on 1 kHz filter	Set deck in record mode. Find differences between 1 kHz recorded portion (L-ch) and "no signal" portion (R-ch).				
		METAL/METAL (or Co (CrO ₂)/MTT-506)	1 kHz/−9 dB (275 mV)	Check	30 dB min. ratio	
19. Adjacent track cross talk	Fig. 5-1 But use LINE IN (R) only as input, and OUTPUT (R) only as OUTPUT	- Record 125 Hz on R-ch (FWD). Note output level of the recorded portion. Invert tape and play R-ch track (FWD). Check leakage level against the output reference of previously recorded portion. - Repeat the above, but in the REV mode.				
		METAL/METAL (or Co (CrO ₂)/MTT-506)	125 Hz/−9 dB (275 mV)	Check	40 dB min. ratio	
20. Dolby NR effect	Fig. 5-1	- Record 1 kHz with DOLBY NR switch OUT. Play it with switch, OUT and IN. Get the output level difference between OUT and IN positions. - Repeat the above process for 10 kHz.				
		METAL/METAL (or Co (CrO ₂)/MTT-506)	1 kHz/−29 dB (27.5 mV)	Check	Variation, 5.5 dB ±2.5 dB	
		"	10 kHz/−39 dB (8.69 mV)	"	" , 10 dB ±2 dB	

5-5 ADJUSTMENT AND TEST POINT LOCATION

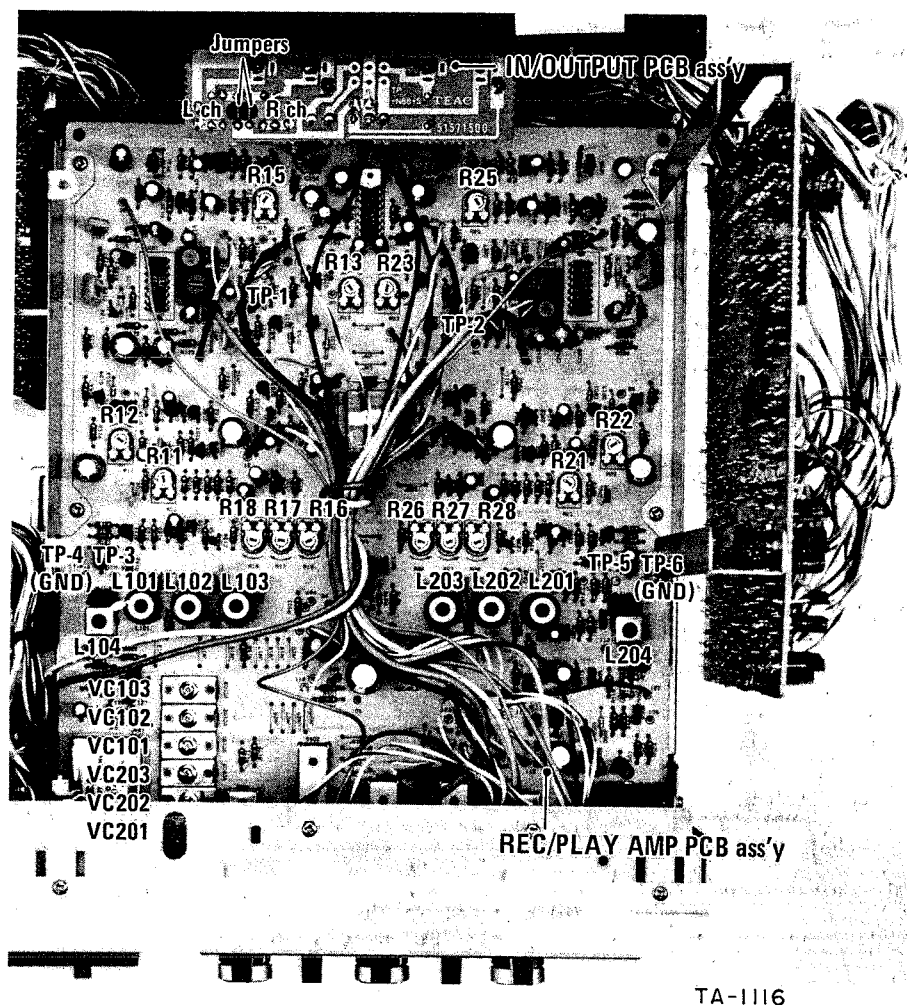
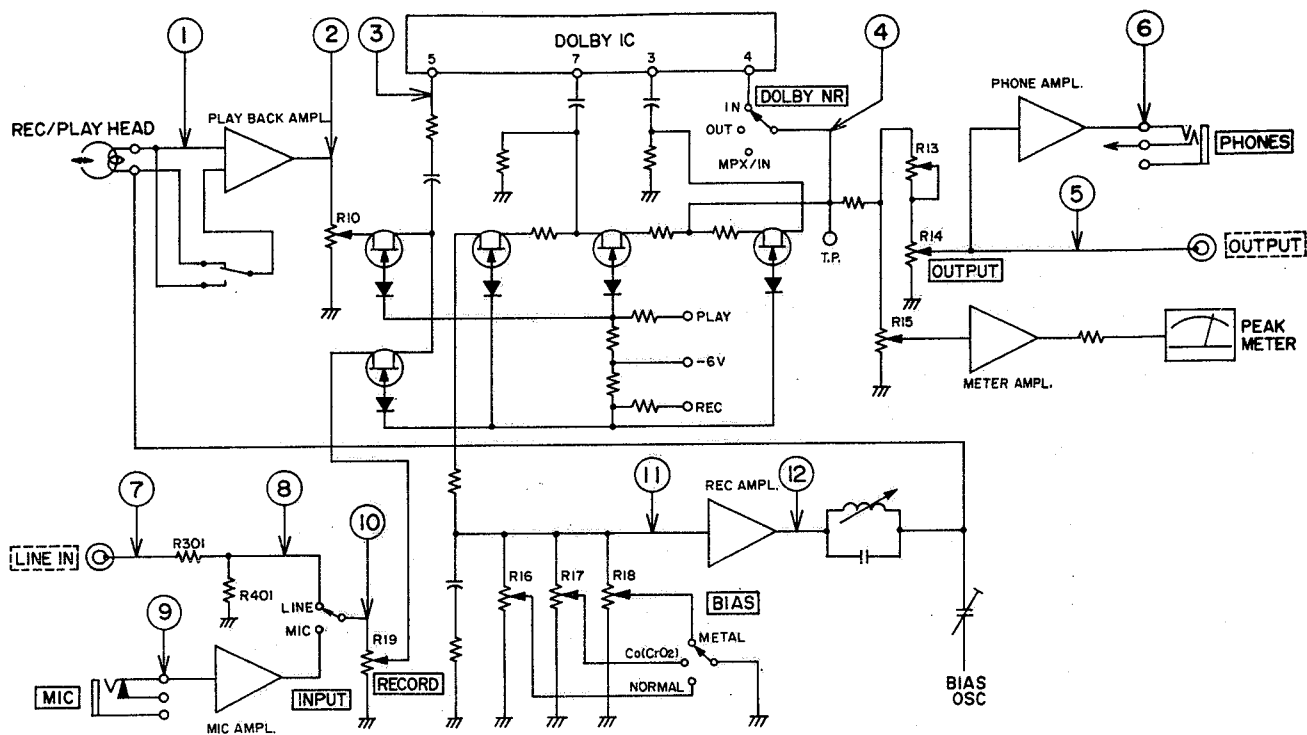
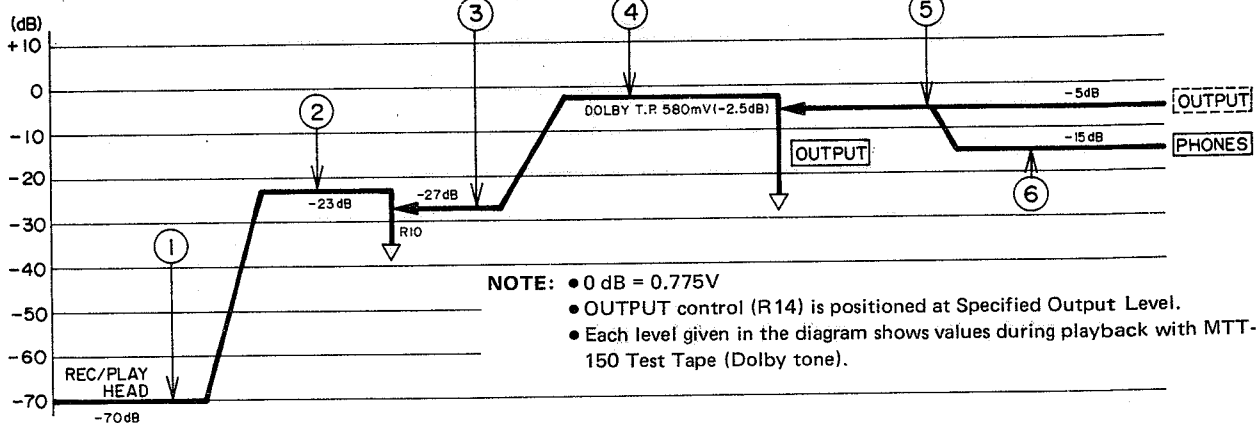


Fig. 5-4

5-6 LEVEL DIAGRAM



PLAYBACK SECTION



RECORDING SECTION

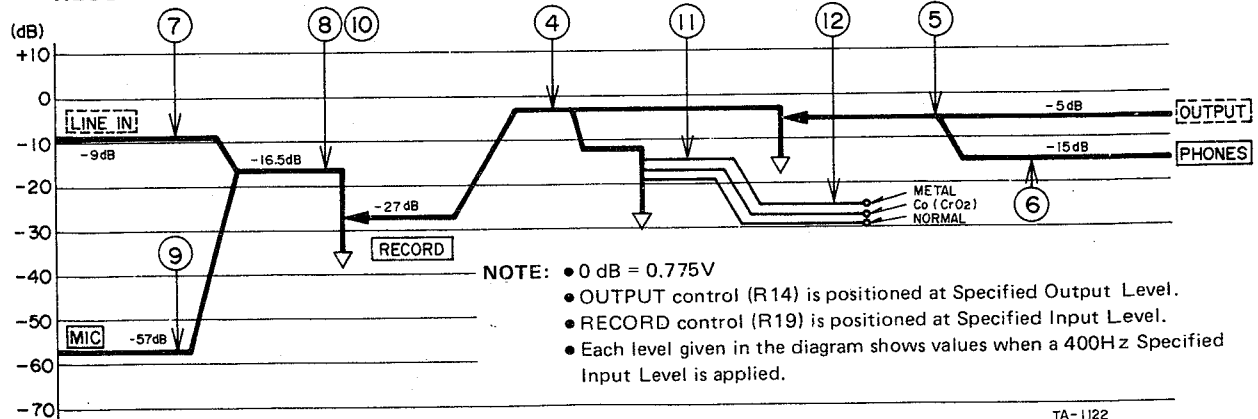
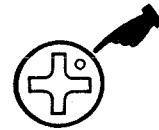


Fig. 5-5

TA-1122

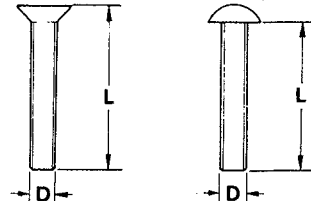
ASSEMBLING HARDWARE CODING LIST

All screws conform to ISO standards, and have crossrecessed heads, unless otherwise noted.
ISO screws have the head inscribed with a point as in the figure to the right.



FOR EXAMPLE:

B M 3 x 6
 ----- Length in mm (L)
 ----- Diameter in mm (D) *
 ----- Metric System
 ----- Nomenclature

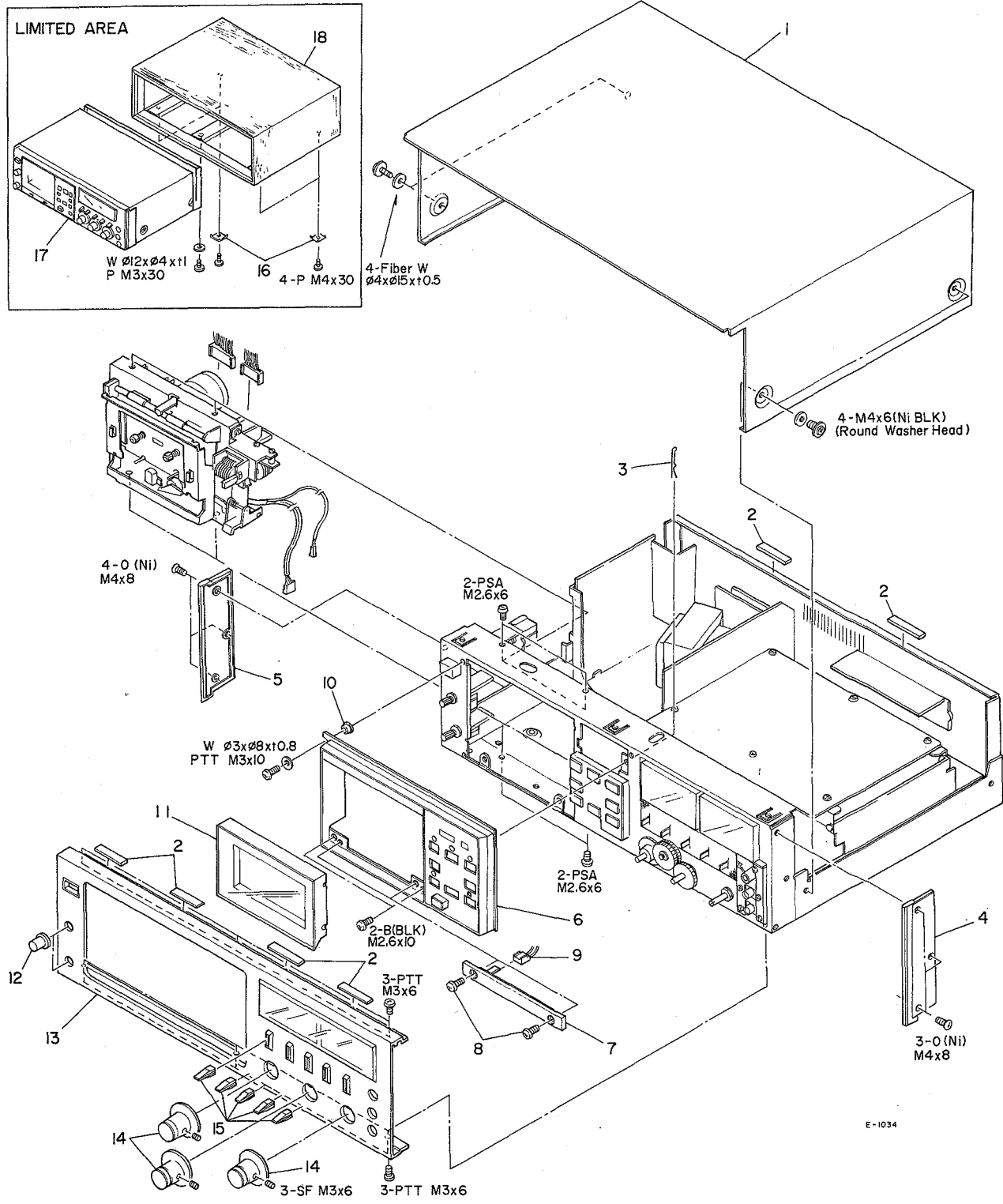


* Inner dia. for washers and nuts

	Code	Name	Type		Code	Name	Type
MACHINE SCREW	R	Round Head Screw		TAPPING SCREW	BTA	Binding Head Tapping Screw(A Type)	
	P	Pan Head Screw			BTB	Binding Head Tapping Screw(B Type)	
	T	Stove Head Screw (Truss)			RTA	Round Head Tapping Screw(A Type)	
	B	Binding Head Screw			RTB	Round Head Tapping Screw(B Type)	
	F	Flat Countersunk Head Screw		SETSCREW	SF	Hex Socket Setscrew(Flat Point)	
	O	Oval Countersunk Head Screw			SC	Hex Socket Setscrew(Cup Point)	
WOOD SCREW	RW	Round Head Wood Screw			SS	Slotted Socket Setscrew(Flat Point)	
TAPTITE SCREW	PTT	Pan Head Taptite Screw		WASHER	E	E-Ring (Retaining Washer)	
	WTT	Washer Head Taptite Screw			W	Flat Washer(Plain)	
SEMS SCREW	BSA	Binding Head SEMS Screw(A Type)			SW	Lock Washer (Spring)	
	BSB	Binding Head SEMS Screw(B Type)			LWI	Lock Washer (Internal Teeth)	
	BSF	Binding Head SEMS Screw(F Type)			LWE	Lock Washer (External Teeth)	
	PSA	Pan Head SEMS Screw(A Type)			TW	Trim Washer (Countersunk)	
	PSB	Pan Head SEMS Screw(B Type)					
				NUT	N	Hex Nut	

6 EXPLODED VIEWS AND PARTS LIST

EXPLODED VIEW - 1



E-1034

Parts marked with *require longer delivery time than regular parts.

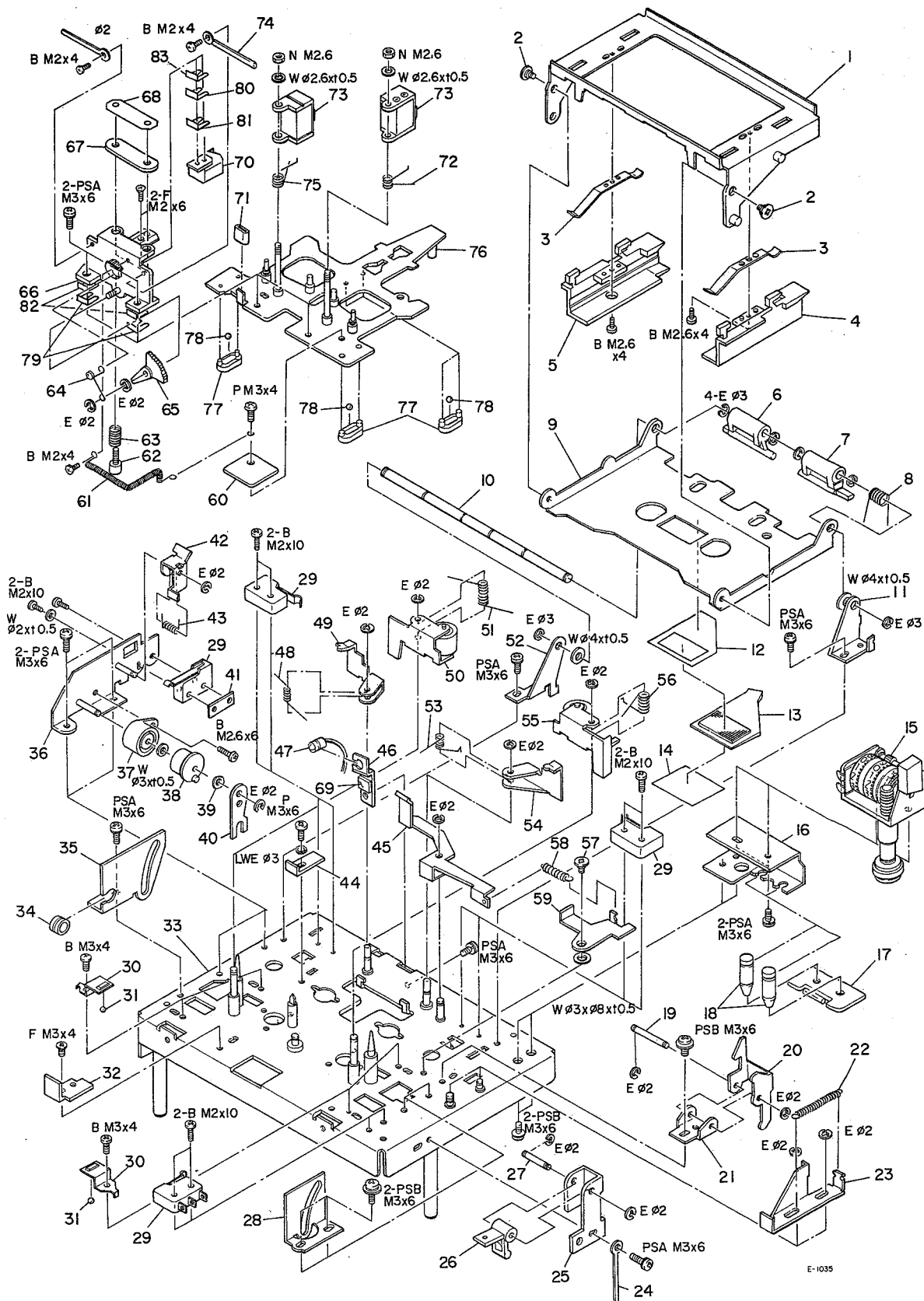
REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
1 - 1	*5551032100	Cover, Top	
1 - 2	*5555570000	Cushion, Top Cover; B	
1 - 3	*5524295001	Spring, Escutcheon	
1 - 4	*5533171000	Sash, Side; A	
1 - 5	*5533172000	Sash, Side; B	
1 - 6	5502270000	Escutcheon, Cassette	
1 - 7	*5143318000	Plate Assy, Direction	
1 - 8	5544729000	Screw, Trim	
1 - 9	*5122165000	Connector, Socket; 3P	
1 - 10	*5555950000	Collar	
1 - 11	5503240000	Cover Assy, Cassette	
1 - 12	5504712000	Knob Assy, TIMER	
1 - 13	5502268000	Panel Assy, Front; A	JAPAN
	5502269000	Panel Assy, Front; B	All except JAPAN
1 - 14	5503190000	Knob Assy, C	
1 - 15	5533120000	Knob, Lever Switch	
1 - 16	*5555526000	Washer	LIMITED AREA
1 - 17	*5552383000	Cover, Shield	LIMITED AREA
1 - 18	*5800022900	Case Assy, Wooden	LIMITED AREA

INCLUDED ACCESSORIES

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
	5128065000	Cord, Input-output Connection	
	5101369000	Information Supplement, Cassette	JAPAN
	5101345000	Information Supplement, Cassette	U.S.A.
	5101495000	Information Supplement, Cassette	All except JAPAN, U.S.A.
	5101724000	f-650R Owner's Manual	JAPAN
	5101725000	CX-650R Owner's Manual	U.S.A.
	5101726000	CX-650R Owner's Manual	All except JAPAN, U.S.A.

NOTE: The f-650R is JAPAN domestic model of the CX-650R.

EXPLODED VIEW - 2



E-1035

Parts marked with *require longer delivery time than regular parts.

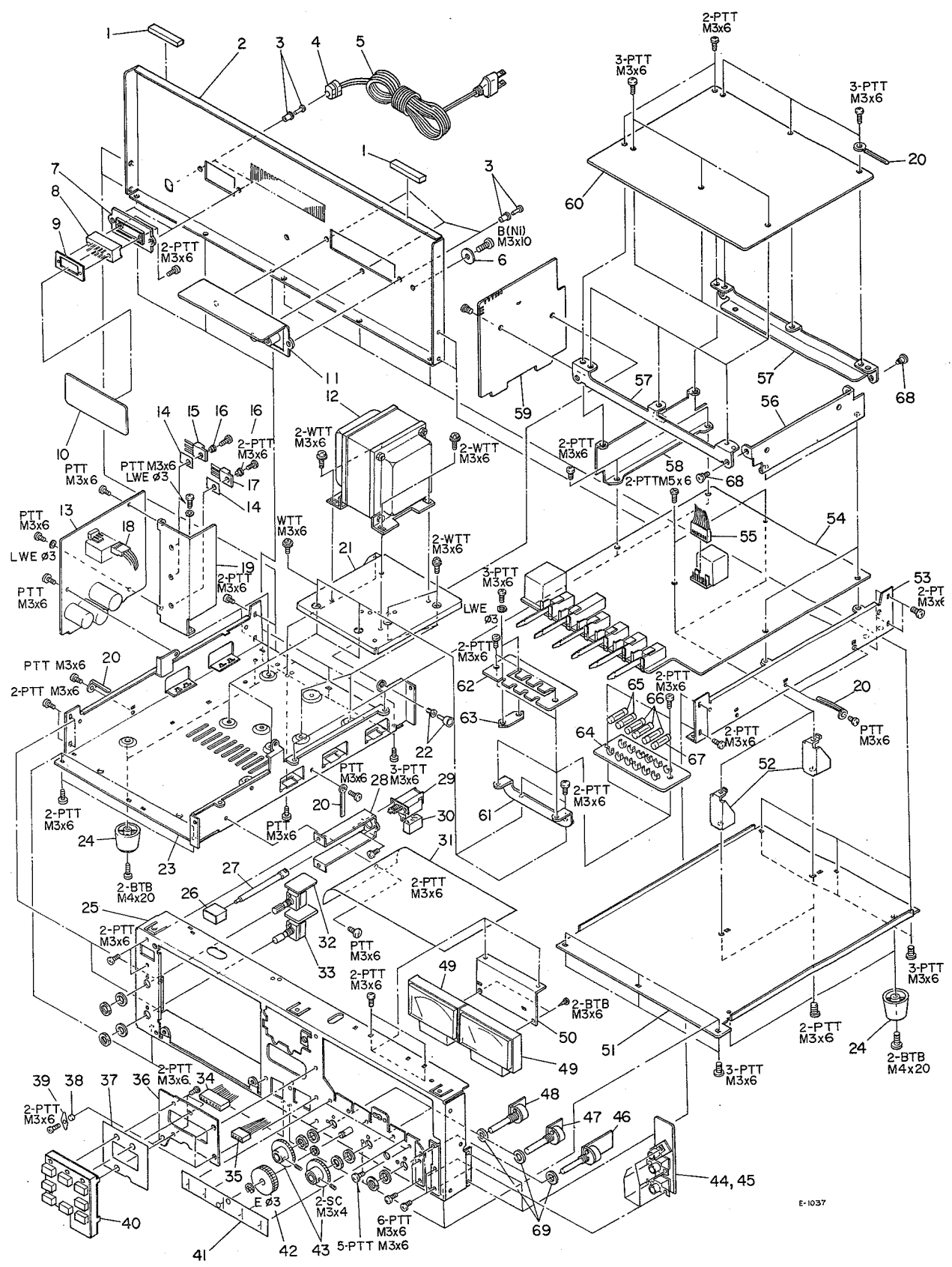
REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
2 - 1	*5504855000	Holder, Cassette; 1	
2 - 2	*5545159000	Screw, Shoulder	
2 - 3	*5555964001	Spring, Cassette Pressure	
2 - 4	5533133000	Guide, Cassette; L	
2 - 5	5533132000	Guide, Cassette; R	
2 - 6	*5534869000	Arm, REC; L	
2 - 7	*5534867000	Arm, REC; R	
2 - 8	*5524303000	Spring, Holder	
2 - 9	*5553371000	Holder, Cassette; 2	
2 - 10	*5545199000	Shaft, Holder	
2 - 11	*5555971000	Bracket, Holder; R	
2 - 12	*5555902000	Tape, Adhesive	
2 - 13	*5534838000	Lens, Lamp	
2 - 14	*5800002900	Plate, Refractive	
2 - 15	5504857000	Counter Assy	
2 - 16	*5555978000	Bracket, Counter	
2 - 17	*5158138000	PCB Assy, REED SWITCH	
	*5167549000	PCB, REED SWITCH	Part of 2 - 17
	*5138006000	Switch, Reed	Part of 2 - 17
2 - 18	*5534448000	Cushion, Rubber	
2 - 19	*5545194000	Shaft, Holder Lock Lever	
2 - 20	*5555974000	Lever, Holder Lock	
2 - 21	*5555975000	Bracket, Holder Lock Lever	
2 - 22	*5524299000	Spring, Eject Plate	
2 - 23	*5555960000	Plate, Eject; 1	
2 - 24	*5581038000	Clamper, Cord; A	
2 - 25	*5555976000	Holder, Eject Cam	
2 - 26	*5534496000	Cam, Eject	
2 - 27	*5544754000	Shaft, Eject Cam	
2 - 28	*5555968001	Guide, Holder; R	
2 - 29	5130003000	Switch, Micro	
2 - 30	*5555850000	Plate, Pressure	
2 - 31	*5540055000	Steel Ball, $\phi 2$	
2 - 32	*5555983000	Plate, Stopper	
2 - 33	*5502272000	Chassis Assy, Mechanism	
2 - 34	*5534525000	Brushing, Rubber	
2 - 35	*5555967001	Guide, Holder; L	
2 - 36	*5504868000	Bracket Assy, Damper	
2 - 37	*5534839000	Damper, 1	
2 - 38	*5534840000	Damper, 2	
2 - 39	*5555352000	Washer, Wave	
2 - 40	*5555905000	Arm, Damper	
2 - 41	*5554447000	Bracket, Switch	
2 - 42	*5555963000	Lever, Switch	
2 - 43	*5800003201	Spring, Switch Lever	
2 - 44	*5555984000	Stopper, Head Base	
2 - 45	*5555969000	Lever, Cassette Pressure	
2 - 46	*5555973000	Bracket, Lamp	
2 - 47	5142039000	Lamp	
2 - 48	*5524297000	Spring, REC Link; L	
2 - 49	*5555965000	Link, REC; L	
2 - 50	5504862000	Pinch Roller Assy; L	
2 - 51	*5524304000	Spring, Pinch Roller; L	
2 - 52	*5555970000	Bracket, Holder; L	
2 - 53	*5524298000	Spring, REC Link; R	
2 - 54	*5555966000	Link, REC; R	
2 - 55	5504863000	Pinch Roller Assy, R	
2 - 56	*5524305000	Spring, Pinch Roller; R	
2 - 57	*5581055000	Screw, Shoulder; D	
2 - 58	*5524302000	Spring, Cassette Pressure Lever	
2 - 59	*5555972000	Lever, Eject Preventing	
2 - 60	*5210000900	PCB, Head Joint	

(Continued on page 24)

Parts marked with *require longer delivery time than regular parts.

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
3 - 1	7105134000	Motor, Capstan	
3 - 2	*5158139001	PCB Assy, MECHANISM	
3 - 3	*5122174000	Connector, Socket; 12P	
3 - 4	*5122172000	Connector, Socket; 10P	
3 - 5	*5581038000	Clamper, Cord; A	
3 - 6	*5552483000	Plate, Flywheel	
3 - 7	*5534811000	Bearing, Flywheel	
3 - 8	5504800000	Flywheel Assy, R	
3 - 9	5534873000	Belt, Capstan	
3 - 10	5504801000	Flywheel Assy, L	
3 - 11	*5555857000	Spring, Thrust	
3 - 12	5504799000	Housing Assy, Capstan	
3 - 13	*5555413000	Washer, Oil Retaining	
3 - 14	*5554611000	Spring, Pressure	
3 - 15	*5555858000	Arm, Base Plate Actuating	
3 - 16	5163051000	Solenoid, H	
3 - 17	*5555980000	Bracket, Solenoid; P	
3 - 18	*5534844000	Cushion, B	
3 - 19	*5502272000	Chassis Assy, Mechanism	
3 - 20	*5555961000	Plate, Eject; 2	
3 - 21	*5524300000	Spring, Eject Plate; 2	
3 - 22	*5555988000	Arm, Pause; R	
3 - 23	*5524307000	Spring, Pause Arm; R	
3 - 24	*5524306000	Spring, Pause Arm; L	
3 - 25	*5555987000	Arm, Pause; L	
3 - 26	5163013000	Solenoid, D	
3 - 27	*5555979000	Bracket, Solenoid; D	
3 - 28	*5555985000	Plate, Change; A	
3 - 29	*5581055000	Screw, Shoulder; D	
3 - 30	*5504860000	Plate Assy, Change; B	
3 - 31	*5524317000	Spring, Change Plate	
3 - 32	*5555989000	Plate, Reverse Actuating	
3 - 33	5504861001	Reel Table Assy	
3 - 34	5800019800	Belt, Counter	
3 - 35	5313000100	Solenoid, P	
3 - 36	*5553373000	Plate, Pause	
3 - 37	*5524315000	Spring, Pause Plate	
3 - 38	*5555977000	Lever, Pause	
3 - 39	*5555872000	Arm, Brake; R	
3 - 40	*5524309000	Spring, Brake; R	
3 - 41	5534116000	Shoe, Brake	
3 - 42	*5524308000	Spring, Brake; L	
3 - 43	*5555871000	Arm, Brake; L	
3 - 44	5504808000	Pulley Assy, Fast Wind	
3 - 45	*5524274000	Spring, Pulley Assy	
3 - 46	*5504807000	Plate Assy, Reel Motor	
3 - 47	7105135000	Motor, Reel	
3 - 48	*5524310000	Spring, Crick	
3 - 49	*5504859000	Lever Assy, Direction	

EXPLODED VIEW - 4



E-1037

Parts marked with *required longer delivery time than regular parts.

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
4 - 1	*5555570000	Cushion, Top Cover; B	
4 - 2	*5552339000	Panel, Rear	
4 - 3	5534118000	Rivet, Push	
4 - 4	*5534660000	Strain Relief, AC Power Cord	All except U.K., AUSTRALIA
	*5534661000	Strain Relief, AC Power Cord	U.K.
	*5534663000	Strain Relief, AC Power Cord	AUSTRALIA
4 - 5	△*5128034000	Cord, AC Power	JAPAN, GENERAL EXPORT
	△*5128075000	Cord, AC Power	U.S.A., CANADA
	△*5128017000	Cord, AC Power	EUROPE
	△*5128036000	Cord, AC Power	U.K.
	△*5128031000	Cord, AC Power	AUSTRALIA
4 - 6	*5555063000	Washer, GND	All except EUROPE, U.K.
4 - 7	*5534866000	Escutcheon, REMOTE	
4 - 8	*5122336000	Connector, Socket; 12P	Part of 4 - 10
4 - 9	*5555566000	Plate, Connector	
4 - 10	*5158135000	PCB Assy, REMOTE	
	*5157135000	PCB, REMOTE	Part of 4 - 10
	*5143118000	Diode, 1S2473HJ (D901)	Part of 4 - 10
	*5181488000	Res., Carbon; 1.8 k ohm ¼W (R901, R902, R904)	Part of 4 - 10
	*5181522000	Res., Carbon; 47 k ohm ¼W (R903)	Part of 4 - 10
	*5181486000	Res., Carbon; 1.5 k ohm ¼W (R905)	Part of 4 - 10
4 - 11	*5158151000	PCB Assy IN/OUTPUT	All except EUROPE
	*5158150000	PCB Assy IN/OUTPUT	EUROPE
	*5157150000	PCB, IN/OUTPUT	Part of 4 - 11
	*5181526000	Carbon Res. 68 k ohm ¼W	R301, R401 Part of 4 - 11
	*5181534000	Carbon Res. 150 k ohm ¼W	R303, R403 Part of 4 - 11
	*5126039000	Terminal Assy	All except EUROPE
	*5126030100	Terminal Assy (with DIN)	EUROPE
4 - 12	△*5152241000	Transformer, Power	JAPAN
	△*5152243000	Transformer, Power	U.S.A., CANADA
	△*5152244000	Transformer, Power	EUROPE, U.K., AUSTRALIA
	△*5152242000	Transformer, Power	GENERAL EXPORT
4 - 13	*5158133000	PCB Assy, POWER SUPPLY	
4 - 14	*5033291000	Plate, Insulating	Part of 4 - 13
4 - 15	*5145087000	Transistor, 2SD313(E)	Part of 4 - 13
4 - 16	*5033295000	Tube, Insulating	Part of 4 - 13
4 - 17	*5147058000	Regulator	Part of 4 - 13
4 - 18	*5122128000	Connector, Socket; 4P	
4 - 19	*5555951000	Heat Sink	
4 - 20	*5581038000	Clamper, Cord; A	
4 - 21	*5553353100	Bracket, Power Transformer; B	
4 - 22	*5534473000	Rivet, T-type	
4 - 23	*5551031200	Chassis, R	
4 - 24	*5504676000	Foot	
4 - 25	*5503239001	Chassis Assy, Front	
4 - 26	*5534431000	Button, B	
4 - 27	*5534422100	Rod, Power Switch	
4 - 28	*5555561000	Bracket, Power Switch	
4 - 29	△*5300017900	Switch, Power	JAPAN
	△*5134036000	Switch, Power	GENERAL EXPORT, AUSTRALIA
	△*5134011000	Switch, Power	EUROPE, U.K.
	△*5134037000	Switch, Power	U.S.A.
	△*5134018000	Switch, Power	CANADA
4 - 30	△*5052905000	Spark Killer, 0.1 mfd +120 ohm 400V AC	JAPAN
	△*5052906000	Spark Killer, 0.033 mfd +120 ohm 125V AC	U.S.A.
	△*5052911000	Spark Killer, 0.033 mfd +120 ohm 250V AC	CANADA
	△*5052908000	Spark Killer, 4700 pfd 250V AC	EUROPE, U.K.
	△*5052907000	Spark Killer, 0.01 mfd +300 ohm 400V AC	GENERAL EXPORT, AUSTRALIA
4 - 31	*5555563000	Paper, Shield	
4 - 32	*5158136000	PCB Assy, SW-A	
	*5157136000	PCB, SW-A	Part of 4 - 32
	*5133019000	Switch, Rotary; DP3T	

(Continued on page 25)

(Continued from page 19)

Parts marked with *require longer delivery time than regular parts.

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
2 - 61	*5624313000	Spring, Shield	
2 - 62	*5545228001	Screw, Adjusting	
2 - 63	*5524314000	Spring, Azimuth Adjusting	
2 - 64	*5524310000	Spring, Crick	
2 - 65	*5534877000	Gear	
2 - 66	*5504865000	Holder Assy, Head	
2 - 67	*5800019500	Plate, Nut	
2 - 68	*5800019600	Spring, Plate	
2 - 69	*5800019900	Cushion	
2 - 70	5569617000	Head, REC/PLAY	
2 - 71	*5534844000	Cushion	
2 - 72	*5524311000	Spring, Erase Head; L	
2 - 73	5569708000	Head Erase	
2 - 74	*5581062000	Clamper, Cord; E	
2 - 75	*5524312000	Spring, Erase Head; R	
2 - 76	*5504858000	Plate Assy, Head Base	
2 - 77	*5534524000	Guide, Steel Ball	
2 - 78	*5540056000	Steel Ball, $\phi 3$	
2 - 79	*5800003900	Spacer, 0.2 mm	
2 - 80	*5800019300	Spacer, B; 0.2 mm	
2 - 81	*5800019200	Spacer, A; 0.1 mm	
2 - 82	*5800022100	Spacer, 0.1 mm	
2 - 83	*5800022200	Spacer, 0.06 mm	

(Continued from page 23)

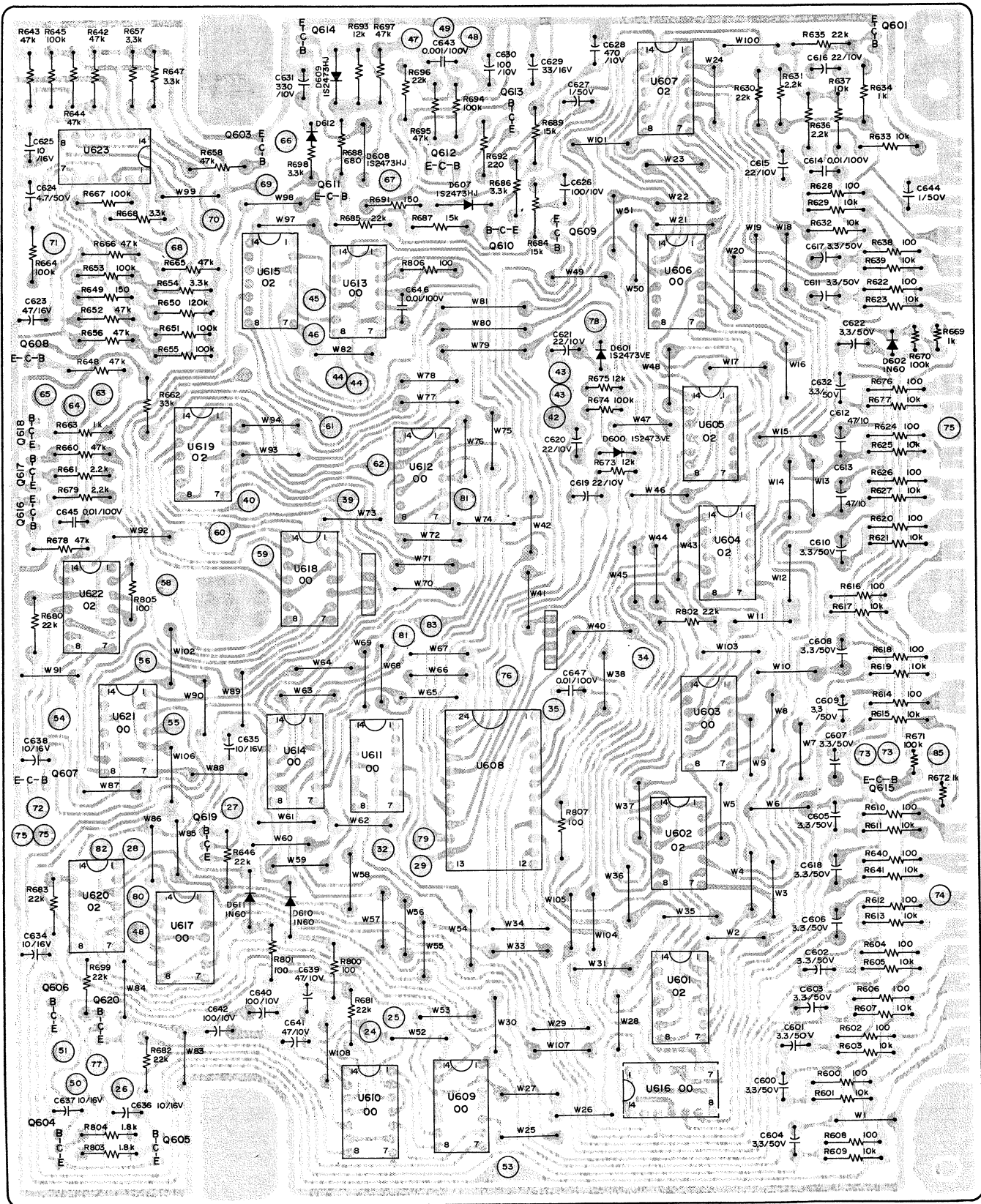
Parts marked with *require longer delivery time than regular parts.

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
4 - 33	*5158137000	PCB Assy SW-B	Part of 4 - 33 Part of 4 - 33
	*5157137000	PCB, SW-B	
	*5133019000	Switch, Rotary; DP3T	
4 - 34	*5122471000	Connector, Socket; 10P	
4 - 35	*5122466000	Connector, Socket; 5P	
4 - 36	*5555954000	Bracket, Key Board Unit	
4 - 37	*5555955000	Plate, Insulating	
4 - 38	*5555953000	Spacer, Switch	
4 - 39	*5555271000	Spring, Key Board	
4 - 40	*5138018000	Key Board Unit	
4 - 41	*5555885000	Mask, SW	
4 - 42	5504678000	Gear Assy, Friction	
4 - 43	*5504677000	Gear Assy, A	
4 - 44	*5158152001	PCB Assy, JACK-105	All except EUROPE
	*5157152001	PCB, JACK-105	Part of 4 - 44
	*5124023000	Jack, MIC	Part of 4 - 44
	*5124022000	Jack, PHONES	Part of 4 - 44
4 - 45	*5158090001	PCB Assy, JACK-104	EUROPE
	*5157090001	PCB, JACK-104	Part of 4 - 45
	*5124028100	Jack, MIC; L	Part of 4 - 45
	*5124023000	Jack, MIC; R	Part of 4 - 45
	*5124022000	Jack, PHONES	Part of 4 - 45
	*5057106000	Carbon Res. 10 k ohm 1/4W	Part of 4 - 45
4 - 46	*5158089000	PCB Assy, OUTPUT VR	
	*5157089000	PCB, OUTPUT VR	Part of 4 - 46
	5150255000	Var. Res., 20 k ohm - A x 2	Part of 4 - 46
4 - 47	*5158156000	PCB Assy, VR (1)	
	*5157156000	PCB, VR (1)	Part of 4 - 47
	5150228000	Var. Res., 100 k ohm - A	Part of 4 - 47
4 - 48	*5158157000	PCB Assy, VR (2)	
	*5157157000	PCB, VR (2)	Part of 4 - 48
	5150228000	Var. Res., 100 k ohm - A	Part of 4 - 48
4 - 49	5165059000	Meter, Peak Level	
4 - 50	*5555562000	Bracket, Meter	
4 - 51	*5552340100	Cover, Bottom	
4 - 52	*5555565200	Bracket, PCB	
4 - 53	*5553269100	Chassis, Side	
4 - 54	*5200001402	PCB Assy, REC/PLAY AMP	
4 - 55	*5522168000	Connector, Socket; 6P	
4 - 56	*5555883001	Bracket, PCB; R	
4 - 57	*5555881000	Bracket, PCB; B	
4 - 58	*5555882000	Bracket, PCB; L	
4 - 59	*5158141000	PCB Assy, CONTROL; B	
4 - 60	*5158140000	PCB Assy, CONTROL; A	
4 - 61	*5555060000	Bracket, B	GENERAL EXPORT, EUROPE, U.K.
4 - 62	*5167548100	PCB, VOLTAGE SELECTOR	GENERAL EXPORT
4 - 63	*5555062000	Bar, Shorting; A	GENERAL EXPORT
4 - 64	*5158134000	PCB Assy, FUSE	EUROPE, U.K.
	*5157134000	PCB, FUSE	Part of 4 - 64
	*5147087000	Holder, Fuse	Part of 4 - 64
4 - 65	△ 5142188000	Fuse, 1.6 AT 250V	EUROPE, U.K.
4 - 66	△ 5041140000	Fuse, 1 AT 250V	EUROPE, U.K.
4 - 67	△ 5041138000	Fuse, 500 mA AT 250V	EUROPE, U.K.
4 - 68	*5581056000	Screw, Shoulder; A	
4 - 69	*5555884000	Washer	

REC/PLAY AMPL PCB ASSY

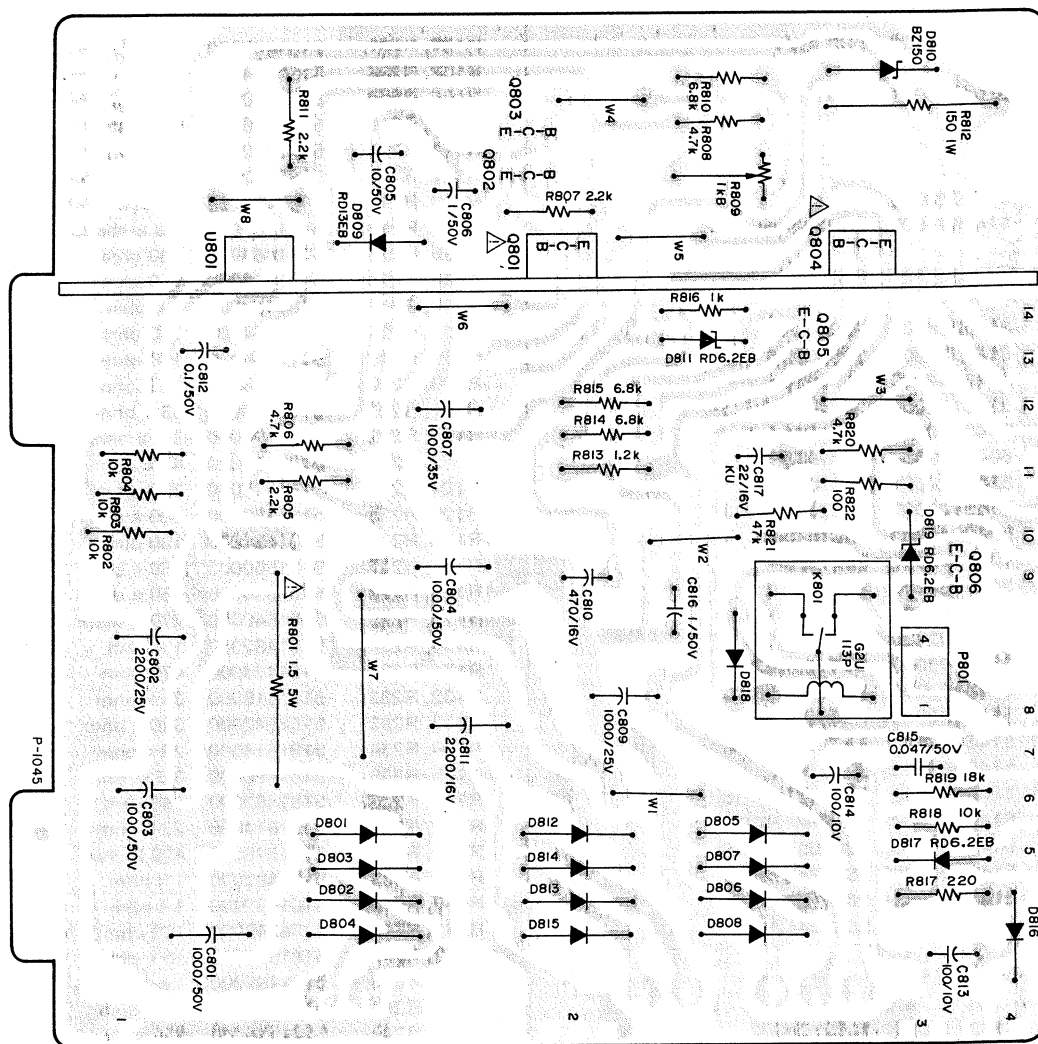


CONTROL PCB A ASSY

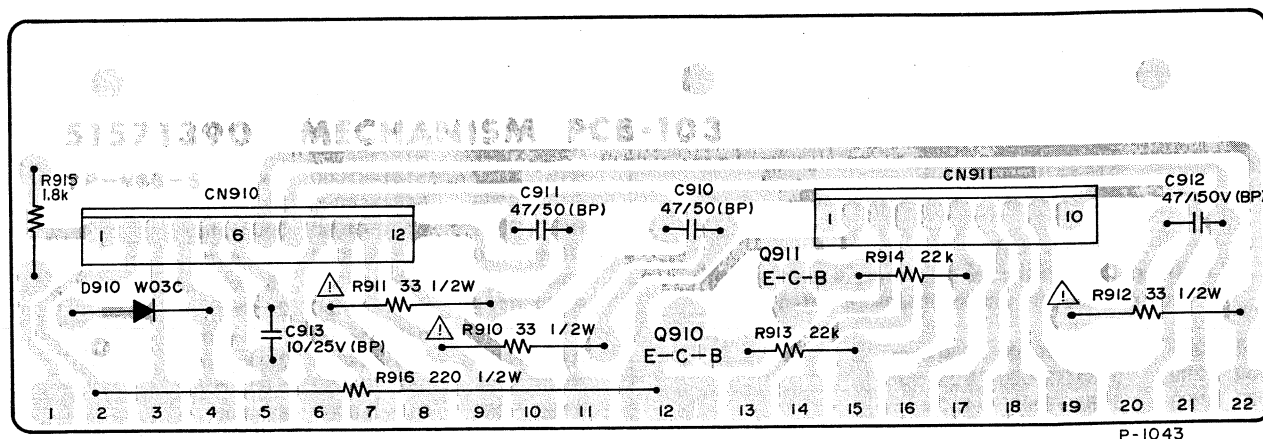


P-1042

POWER SUPPLY PCB ASSY



MECHANISM PCB ASSY



P-1043

REC/PLAY AMPL PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	5200001402	PCB Ass'y
	5157088001	PCB
	ICs	
U101, U201	5042728000	Dolby
U501	5147074000	Head phone
	TRANSISTORS	
Q101, Q201	5145034000	2SC900UA
Q102, Q202	5145034000	2SC900UA
Q103, Q203	5042549000	2SC1636-1
Q104, Q204	5145122000	2SC2021LNF(S)
Q105, Q205	5042549000	2SC1636-1
Q106, Q206	5042549000	2SC1636-1
Q107, Q207	5145034000	2SC900UA
Q108, Q208	5145122000	2SC2021LNF(S)
Q109, Q209	5042549000	2SC1636-1
Q110, Q210	5042549000	2SC1636-1
Q111, Q211	5145034000	2SC900UA
Q112, Q212	5042549000	2SC1636-1
Q113, Q213	5145102000	FET, 2SK68AL
Q114, Q214	5145102000	FET, 2SK68AL
Q115, Q215	5145102000	FET, 2SK68AL
Q116, Q216	5145102000	FET, 2SK68AL
Q117, Q217	5145102000	FET, 2SK68AL
Q501	5145098000	2SC1741Q
Q502	5145122000	2SC2021LNF(S)
Q503	5145123000	2SA786LNF(R)
Q504	5145122000	2SC2021LNF(S)
Q505	5145123000	2SA786LNF(R)
Q506	5145123000	2SA786LNF(R)
Q507	5145098000	2SC1741Q
	DIODES	
D101, D201	5143118000	1S2473HJ
D102, D202	5143118000	1S2473HJ
D103, D203	5143118000	1S2473HJ
D104, D204	5143118000	1S2473HJ
D105, D205	5142213000	1N60
D106, D206	5143118000	1S2473HJ
D176, D276	5143118000	1S2473HJ
D501	5042213000	1N60
D502	5143118000	1S2473HJ
D503	5143118000	1S2473HJ
D504	5143316000	W03C
D505	5042213000	1N60
D506	5143316000	W03C
D507	5143184000	Zener, EQA01-06S
	RESISTORS	
All resistors are rated $\pm 5\%$ tolerance, $\frac{1}{4}$ watt and of carbon resistors unless otherwise noted.		
R101, R201	5181470000	330 ohm
R102, R202	5181528000	82 k ohm
R103, R203	5181530000	100 k ohm
R104, R204	5181526000	68 k ohm
R105, R205	5181462000	150 ohm
R106, R206	5181500000	5.6 k ohm

REF. NO.	PARTS NO.	DESCRIPTION
R107, R207	5181462000	150 ohm
R108, R208	5181474000	470 ohm
R109, R209	5181530000	100 k ohm
R110, R210	5181506000	6.8 k ohm
R111, R211	5181542000	330 k ohm
R112, R212	5181492000	2.7 k ohm
R113, R213	5181494000	3.3 k ohm
R114, R214	5181500000	5.6 k ohm
R115, R215	5181464000	180 ohm
R116, R216	5181464000	180 ohm
R117, R217	5181482000	1 k ohm
R118, R218	5181464000	180 ohm
R119, R219	5181464000	180 ohm
R120, R220	5181518000	33 k ohm
R121, R221	5181518000	33 k ohm
R122, R222	5181494000	3.3 k ohm
R123, R223	5181522000	47 k ohm
R124, R224	5181518000	33 k ohm
R125, R225	5181530000	100 k ohm
R126, R226	5181464000	180 ohm
R127, R227	5181550000	680 k ohm
R128, R228	5181534000	150 k ohm
R129, R229	5181540000	270 k ohm
R130, R230	5181482000	1 k ohm
R131, R231	5181474000	470 ohm
R132, R232	5181518000	33 k ohm
R133, R233	5181542000	330 k ohm
R134, R234	5181514000	22 k ohm
R135, R235	5181496000	3.9 k ohm
R136, R236	5181462000	150 ohm
R137, R237	5181514000	22 k ohm
R138, R238	5181546000	470 k ohm
R139, R239	5181482000	1 k ohm
R140, R240	5181482000	1 k ohm
R141, R241	5184249000	100 ohm Non Flammable
R142, R242	5181510000	15 k ohm
R143, R243	5181482000	1 k ohm
R144, R244	5181506000	10 k ohm
R145, R245	5181538000	220 k ohm
R146, R246	5181526000	68 k ohm
R147, R247	5181470000	330 ohm
R148, R248	5181500000	5.6 k ohm
R149, R249	5181470000	330 ohm
R150, R250	5181476000	560 ohm
R151, R251	5181520000	39 k ohm
R152, R252	5181482000	1 k ohm
R153, R253	5181530000	100 k ohm
R154, R254	5181500000	5.6 k ohm
R155, R255	5181498000	4.7 k ohm
R156, R256	5181492000	2.7 k ohm
R157, R257	5181482000	1 k ohm
R158, R258	5181514000	22 k ohm
R159, R259	5181544000	390 k ohm
R160, R260	5181518000	33 k ohm
R161, R261	5181512000	18 k ohm
R162, R262	5181444000	27 ohm
R163, R263	5181484000	1.2 k ohm
R164, R264	5181494000	3.3 k ohm
R165, R265	5181500000	5.6 k ohm
R166, R266	5181456000	82 ohm
R167, R267	5181530000	100 k ohm
R168, R268	5181530000	100 k ohm
R169, R269	5181512000	18 k ohm

REF. NO.	PARTS NO.	DESCRIPTION
R170, R270	5181448000	39 ohm
R171, R271	5183146000	470 k ohm
R172, R272	5181538000	220 k ohm
R173, R273	5181482000	1 k ohm
R174, R274	5181476000	560 ohm
R175, R275	5181482000	1 k ohm
R179, R279	5181482000	1 k ohm
R180, R280	5181482000	1 k ohm
R181, R281	5181546000	470 k ohm
R501	5181506000	10 k ohm
R502	5181508000	12 k ohm
R503	5181508000	12 k ohm
R504	5181510000	15 k ohm
R505	5181528000	82 k ohm
R506	5181410000	1 ohm
R507	5181508000	12 k ohm
R508	5181476000	560 ohm
R509	5181508000	12 k ohm
R510	5181486000	1.5 k ohm
R511	5181508000	12 k ohm
R512	5181536000	180 k ohm
R513	5181508000	12 k ohm
R514	5181476000	560 ohm
R515	5181508000	12 k ohm
R516	5181486000	1.5 k ohm
R517	5181508000	12 k ohm
R518	5181514000	22 k ohm
R519	5181514000	22 k ohm
R520	5181536000	180 k ohm
R521	5181532000	120 k ohm
R522	5181530000	100 k ohm
R523	5181496000	10 k ohm
R524	5181504000	8.2 k ohm
R525	△5185664000	15 ohm Non Flammable
R527	5181514000	22 k ohm
R528	5181514000	22 k ohm
R529	△5183564000	27 ohm Non Flammable

CAPACITORS

C101, C201	5172219000	Ceramic	390 pfd	50V
C102, C202	5173672800	Elec.	10 mfd	16V(MD)
C103, C203	5172212000	Ceramic	100 pfd	50V
C104, C204	5172213000	Ceramic	120 pfd	50V
C105, C205	5173650800	Elec.	0.22 mfd	50V(MD)
C106, C206	5173154800	Elec.	22 mfd	10V(USM)
C107, C207	5171856800	Mylar	0.01 mfd	100V 50%
C108, C208	5173634800	Elec.	0.22 mfd	50V(MD)
C109, C209	5171862800	Mylar	0.018 mfd	100V 5%
C110, C210	5173054800	Elec.	220 mfd	16V(USM)
C111, C211	5173054800	Elec.	220 mfd	16V(USM)
C112, C212	5170300100	Dip. Tant.	0.33 mfd	35V 10%
C113, C213	5173652800	Elec.	3.3 mfd	25V(MD)
C114, C214	5173652800	Elec.	3.3 mfd	25V(MD)
C115, C215	5171866800	Mylar	0.027 mfd	100V 5%
C116, C216	5170370800	Mylar	0.0056 mfd	100V 5%
C117, C217	5170368800	Mylar	0.0047 mfd	100V 5%
C118, C218	5173140800	Elec.	10 mfd	16V(USM)
C119, C219	5173200800	Elec.	220 mfd	10V(USM)
C120, C220	5173140800	Elec.	10 mfd	16V(USM)
C121, C221	5171872800	Mylar	0.047 mfd	100V 5%
C122, C222	5173140800	Elec.	10 mfd	16V(USM)
C123, C223	5171878800	Mylar	0.1 mfd	100V 5%
C124, C224	5170300100	Dip. Tant.	0.33 mfd	35V 10%

C125, C225	5054668100	Dip. Tant.	0.47 mfd	35V
C126, C226	5173630800	Elec.	0.1 mfd	50V(MD)
C127, C227	5173192800	Elec.	100 mfd	10V(USM)
C128, C228	5173184800	Elec.	47 mfd	25V(USM)
C129, C229	5173160800	Elec.	22 mfd	35V(USM)
C130, C230	5173184800	Elec.	47 mfd	25V(USM)
C131, C231	5173672800	Elec.	10 mfd	16V(USM)
C132, C232	5172212000	Ceramic	100 pfd	50V
C133, C233	5172208000	Ceramic	47 pfd	50V
C134, C234	5173672800	Elec.	10 mfd	16V(USM)
C135, C235	5173180800	Elec.	47 mfd	10V(USM)
C136, C236	5173642800	Elec.	1 mfd	50V(MD)
C137, C237	5173054800	Elec.	220 mfd	16V(USM)
C138, C238	5054669100	Dip. Tant.	0.68 mfd	35V 10%
C139, C239	5173140800	Elec.	10 mfd	16V(USM)
C140, C240	5173638800	Elec.	0.47 mfd	50V(MD)
C141, C241	5171858800	Mylar	0.012 mfd	100V 5%
C142, C242	5171866800	Mylar	0.027 mfd	100V 5%
C143, C243	5171862800	Mylar	0.018 mfd	100V 5%
C144, C244	5171868800	Mylar	0.033 mfd	100V 5%
C145, C245	5171868800	Mylar	0.033 mfd	100V 5%
C146, C246	5054745000	Dip. Mica	220 pfd	50V
C147, C247	5173638800	Elec.	0.47 mfd	50V(MD)
C148, C248	5173140800	Elec.	10 mfd	16V(USM)
C150, C250	5173194800	Elec.	100 mfd	16V(USM)
C151, C251	5171856800	Mylar	0.01 mfd	100V 5%
C501	5173104800	Elec.	1 mfd	50V(USM)
C502	5173658800	Elec.	4.7 mfd	25V(MD)
C503	5173686800	Elec.	4.7 mfd	25V(USM)
C504	5173071800	Elec.	470 mfd	10V(USM)
C505	5173180800	Elec.	47 mfd	10V(USM)
C506	5173200800	Elec.	220 mfd	10V(USM)
C507	5173104800	Elec.	1 mfd	50V(USM)
C508	5173196800	Elec.	100 mfd	25V(USM)
C509	5173080800	Elec.	1000 mfd	10V(USM)
C510	5173194800	Elec.	100 mfd	16V(MD)
C512	5173170800	Elec.	33 mfd	25V(USM)

VARIABLE RESISTORS

R11, R21	5150097000	Semi-fixed, 5 k ohm - B
R12, R22	5150096000	Semi-fixed, 100 k ohm - B
R13, R23	5150092000	Semi-fixed, 10 k ohm - B
R15, R25	5150094000	Semi-fixed, 50 k ohm - B
R16, R26	5150094000	Semi-fixed, 50 k ohm - B
R17, R27	5150094000	Semi-fixed, 50 k ohm - B
R18, R28	5150094000	Semi-fixed, 50 k ohm - B

TRIMMER CAPACITORS

VC101, VC201	5170017000	150 pfd	MAX
VC102, VC202	5170017000	150 pfd	MAX
VC103, VC203	5054704000	100 pfd	MAX

MISCELLANEOUS

U102, U202	5160066000	MPX Filter Unit
L101, L201	5056637000	Coil, Rec EQ; 4.2/2.4 mH
L102, L202	5056037000	Coil, Rec EQ; 4.2/2.4 mH
L103, L203	5056037000	Coil, Rec EQ; 4.2/2.4 mH
L104, L204	5056655000	Coil, Trap; 12 mH
S501	5132037000	Switch, Lever; DPDT
S502	5132038000	Switch, Lever; 6P3T
S503	5132034000	Switch, Lever; 4P3T

REF. NO.	PARTS NO.	DESCRIPTION
S504	5132640000	Switch, Lever; 4P3T
S505	5132039000	Switch, Lever; 4PDT
U502	5040101000	Bias Oscillator Unit, 100 k Hz
K501	5061142000	Relay, DPDT
P502	5122130000	Connector, Plug; 6P

CONTROL PCB A ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	5158140000	PCB Assy
	5157140000	PCB (CONTROL PCB-123)
	ICs	
U601, U602	5147057000	HD7402P
U603	5147056000	HD7400P
U604, U605	5147057000	HD7402P
U606	5147056000	HD7400P
U607	5147057000	HD7402P
U608	5147054000	AN6251
U609 ~ U614	5147056000	HD7400P
U615	5147057000	HD7402P
U616 ~ U618	5147056000	HD7400P
U619 ~ U621	5147057000	HD7402P
U622	5147056000	HD7400P
U623	5147039000	NJM2901N

TRANSISTORS

Q601	5145091000	2SC945AK
Q603 ~ Q610	5145091000	2SC945AK
Q611	5042553000	2SA733P
Q612 ~ Q620	5145091000	2SC945AK

DIODES

D600, D601	5042517000	1S2473VE
D602	5042213000	1N60
D607 ~ D609	5143118000	1S2473HJ
D610, D611	5042213000	1N60
D612	5042550000	1S2473

CARBON RESISTORS

All resistors are rated $\pm 5\%$ tolerance and $\frac{1}{4}$ watt.

R600	5181458000	100 ohm
R601	5181506000	10 k ohm
R602	5181458000	100 ohm
R603	5181506000	10 k ohm
R604	5181458000	100 ohm
R605	5181506000	10 k ohm
R606	5181458000	100 ohm
R607	5181506000	10 k ohm
R608	5181458000	100 ohm
R609	5181506000	10 k ohm
R610	5181458000	100 ohm
R611	5181506000	10 k ohm
R612	5181458000	100 ohm

REF. NO.	PARTS NO.	DESCRIPTION
R613	5181506000	10 k ohm
R614	5181458000	100 ohm
R615	5181506000	10 k ohm
R616	5181458000	100 ohm
R617	5181506000	10 k ohm
R618	5181458000	100 ohm
R619	5181506000	10 k ohm
R620	5181458000	100 ohm
R621	5181506000	10 k ohm
R622	5181458000	100 ohm
R623	5181506000	10 k ohm
R624	5181458000	100 ohm
R625	5181506000	10 k ohm
R626	5181458000	100 ohm
R627	5181506000	10 k ohm
R628	5181458000	100 ohm
R629	5181506000	10 k ohm
R630	5181514000	22 k ohm
R631	5181490000	2.2 k ohm
R632, R633	5181506000	10 k ohm
R634	5181482000	1 k ohm
R635	5181514000	22 k ohm
R636	5181490000	2.2 k ohm
R637	5181506000	10 k ohm
R638	5181458000	100 ohm
R639	5181506000	10 k ohm
R640	5181458000	100 ohm
R641	5181506000	10 k ohm
R642 ~ R644	5181522000	47 k ohm
R645	5181530000	100 k ohm
R646	5181514000	22 k ohm
R647	5181494000	3.3 k ohm
R648	5181522000	47 k ohm
R649	5181462000	150 ohm
R650	5181532000	120 k ohm
R651	5181530000	100 k ohm
R652	5181522000	47 k ohm
R653	5181530000	100 k ohm
R654	5181494000	3.3 k ohm
R655	5181530000	100 k ohm
R656	5181522000	47 k ohm
R657	5181494000	3.3 k ohm
R658	5181522000	47 k ohm
R660	5181522000	47 k ohm
R661	5181490000	2.2 k ohm
R662	5181518000	33 k ohm
R663	5181482000	1 k ohm
R664	5181530000	100 k ohm
R665, R666	5181522000	47 k ohm
R667	5181530000	100 k ohm
R668	5181494000	3.3 k ohm
R669	5057082000	1 k ohm
R670, R671	5057130000	100 k ohm
R672	5057082000	1 k ohm
R673	5057108000	12 k ohm
R674	5057130000	100 k ohm
R675	5057108000	12 k ohm
R676	5181458000	100 ohm
R677	5181506000	10 k ohm
R678	5181522000	47 k ohm
R679	5181490000	2.2 k ohm
R680 ~ R683	5181514000	22 k ohm
R684	5181486000	1.5 k ohm

CONTROL PCB B ASSY

REF. NO.	PARTS NO.	DESCRIPTION
R685	5181514000	22 k ohm
R686	5181149000	3.3 k ohm
R687	5181510000	15 k ohm
R688	5181478000	680 ohm
R689	5181510000	15 k ohm
R691	5181462000	150 ohm
R692	5181466000	220 ohm
R693	5181508000	12 k ohm
R694	5181533000	100 k ohm
R695	5181522000	47 k ohm
R696	5181514000	22 k ohm
R697	5181522000	47 k ohm
R698	5181294000	3.3 k ohm
R699	5181514000	22 k ohm
R800, R801	5181458000	100 ohm
R802	5181490000	2.2 k ohm
R803, R804	5181488000	1.8 k ohm
R805~R807	5181458000	100 ohm

CAPACITORS

C600~C611	5173120800	Elec.	3.3 mfd	50V(USM)
C612, C613	5173035800	Elec.	47 mfd	10V
C614	5171856800	Mylar	0.01 mfd	100V
C615, C616	5173154800	Elec.	22 mfd	10V(USM)
C617, C618	5173120800	Elec.	3.3 mfd	50V(USM)
C619~C621	5173154800	Elec.	22 mfd	10V(USM)
C622	5173120800	Elec.	3.3 mfd	50V(USM)
C623	5173182800	Elec.	47 mfd	16V(USM)
C624	5173132800	Elec.	4.7 mfd	50V(USM)
C625	5173140800	Elec.	10 mfd	16V(USM)
C626	5173192800	Elec.	100 mfd	10V(USM)
C627	5173104800	Elec.	1 mfd	50V(USM)
C628	5173071800	Elec.	470 mfd	10V(USM)
C629	5173168800	Elec.	33 mfd	16V(USM)
C630	5173192800	Elec.	100 mfd	10V(USM)
C631	5173062800	Elec.	330 mfd	10V(USM)
C632	5173120800	Elec.	3.3 mfd	50V(USM)
C634~C638	5173140800	Elec.	10 mfd	16V(USM)
C639	5173180800	Elec.	47 mfd	10V(USM)
C640	5173192800	Elec.	100 mfd	10V(USM)
C641	5173180800	Elec.	47 mfd	10V(USM)
C642	5173192800	Elec.	100 mfd	10V(USM)
C643	5170376000	Mylar	0.001 mfd	100V 10%
C644	5173104800	Elec.	1 mfd	50V(USM)
C645~C647	5171856800	Mylar	0.01 mfd	100V
C648, C649	5054802000	Mylar	0.01 mfd	50V

MISCELLANEOUS

5147041000	Socket, IC; 24P
5127625000	

REF. NO.	PARTS NO.	DESCRIPTION
	5158141000	PCB Assy
	5157141000	PCB (CONTROL PCB-124)

TRANSISTORS

Q701	5145091000	2SC945AK
Q702	5042625000	2SC1318S
Q703	5145087000	2SD313E
Q704	5145091000	2SC945AK
Q705	5042553000	2SA733P
Q706	5145087000	2SD313E
Q707	5145091000	2SC945AK
Q708	5042625000	2SC1318S
Q709	5145087000	2SD313E
Q710	5145091000	2SC945AK
Q711	5142553000	2SA733P
Q712	5145087000	2SD313E
Q713	5145091000	2SC945AK
Q714	5042625000	2SC1318S
Q715	5145087000	2SD313E
Q716	5145091000	2SC945AK
Q717	5042553000	2SA733P
Q718	5145087000	2SD313E
Q719	5145091000	2SC945AK
Q720	5145092000	2SC1740LN(S)
Q721	5145131000	2SA933LN(R)
Q722	5145092000	2SC1740LN(S)
Q724	5145091000	2SC945AK
Q725, Q726	5145092000	2SC1740LN(S)
Q727, Q728	5145091000	2SC945AK
Q729	5042491000	2SC1384R
Q730, Q731	5145091000	2SC945AK
Q732	5042491000	2SC1384R
Q734, Q735	5145085000	2SA934
Q736	5145087000	2SD313E
Q737~Q739	5145091000	2SC945AK
Q740	5042491000	2SC1384R

DIODES

D701	5143315000	W03C
D702	5143018000	U05E
D703, D704	5143315000	W03C
D705	5143018000	U05E
D706, D707	5143315000	W03C
D708	5143018000	U05E
D709	5143315000	W03C
D710	5143118000	1S2473HJ
D711	5042554000	Zener, RD-6.2EB
D712~D714	5143118000	1S2473HJ

CARBON RESISTORS

All resistors are rated $\pm 5\%$ tolerance and $\frac{1}{4}$ watt unless otherwise noted.

R701	5181522000	47 k ohm
R702	5181490000	2.2 k ohm
R703	5181458000	100 ohm
R704	5181500000	5.6 k ohm
R705	5180278000	680 ohm $\frac{1}{2}W$
R706	5181530000	100 k ohm
R707, R708	5181506000	10 k ohm

REF. NO.	PARTS NO.	DESCRIPTION
R709	5181522000	47 k ohm
R710	5181434000	10 ohm
R711	5181506000	10 k ohm
R712	5181522000	47 k ohm
R713	5181490000	2.2 k ohm
R714	5181458000	100 ohm
R715	5181500000	5.6 k ohm
R716	5180278000	680 ohm ½W
R717	5181530000	100 k ohm
R718, R719	5181506000	10 k ohm
R720	5181522000	47 k ohm
R721	5181434000	10 ohm
R722	5181506000	10 k ohm
R723	5181522000	47 k ohm
R724	5181490000	2.2 k ohm
R725	5181458000	100 ohm
R726	5181500000	5.6 k ohm
R727	5180278000	680 ohm ½W
R728	5181530000	100 k ohm
R729, R730	5181506000	10 k ohm
R731	5181522000	47 k ohm
R732	5181434000	10 ohm
R733	5181506000	10 k ohm
R734	5181518000	33 k ohm
R735	5181498000	4.7 k ohm
R736	5181506000	10 k ohm
R737	5181498000	4.7 k ohm
R738	5181486000	1.5 k ohm
R739	5181508000	12 k ohm
R740	5181482000	1 k ohm
R741	5181494000	3.3 k ohm
R742	5181510000	15 k ohm
R743	5181476000	560 ohm
R744	5181494000	3.3 k ohm
R747	5181518000	33 k ohm
R748	5181498000	4.7 k ohm
R749	5181458000	100 ohm
R750	5181518000	33 k ohm
R751	5181458000	100 ohm
R752	5181494000	3.3 k ohm
R753	5181524000	56 k ohm
R754	5181498000	4.7 k ohm
R755	5181494000	3.3 k ohm
R756	5181458000	100 ohm
R757	5181522000	47 k ohm
R758	5181498000	4.7 k ohm
R759	5181518000	33 k ohm
R760	5181500000	5.6 k ohm
R761	5181522000	47 k ohm
R762	5181498000	4.7 k ohm
R763	5181518000	33 k ohm
R764	5181500000	5.6 k ohm
R765	5181494000	3.3 k ohm
R766, R767	5181542000	330 k ohm
R768	5181494000	3.3 k ohm
R769	5181478000	680 ohm
R770, R771	5181468000	270 ohm
R772	5181500000	5.6 k ohm
R773	5181514000	22 k ohm
R774	5181522000	47 k ohm
R775	5181498000	4.7 k ohm
R776	5181514000	22 k ohm
R777	5181500000	5.6 k ohm

REF. NO.	PARTS NO.	DESCRIPTION
R778	5181490000	2.2 k ohm
CAPACITORS		
C701 ~ C703	5173112800	Elec. 2.2 mfd 50V(USM)
C704	5173158800	Elec. 22 mfd 25V(USM)
C705	5173140800	Elec. 10 mfd 16V(USM)
C706	5173158800	Elec. 22 mfd 25V(USM)
C707	5173130800	Elec. 4.7 mfd 35V(USM)
C708, C709	5173140800	Elec. 10 mfd 16V(USM)
C710, C711	5171856800	Mylar 0.01 mfd 100V 5%
C712	5173180800	Elec. 47 mfd 10V(USM)
C713	5173062800	Elec. 330 mfd 10V(USM)

MISCELLANEOUS

5800004000 Bracket, Transistor
Screw, M3 x 6
Nut, M3

POWER SUPPLY PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	5158133000	PCB Assy
	5157133000	PCB
IC		
U801	△ 5147058000	NJM78M05A
TRANSISTORS		
Q801	△ 5145087000	2SD313(E)
Q802, Q803	5145092000	2SC1740LN(S)
Q804	△ 5145087000	2SD313(E)
Q805	5145092000	2SC1740LN(S)
Q806	5145098000	2SC1741Q

DIODES

D801 ~ D808	5143113000	1SR34-200HM
D809	5143108000	RD13EB
D810	5143312000	BZ-150
D811	5042554000	RD6.2EB
D812 ~ D815	5143113000	1SR34-200HM
D816	5143315000	W03C
D817	5042554000	RD6.2EB
D818	5143315000	W03C
D819	5042554000	RD6.2EB

RESISTORS

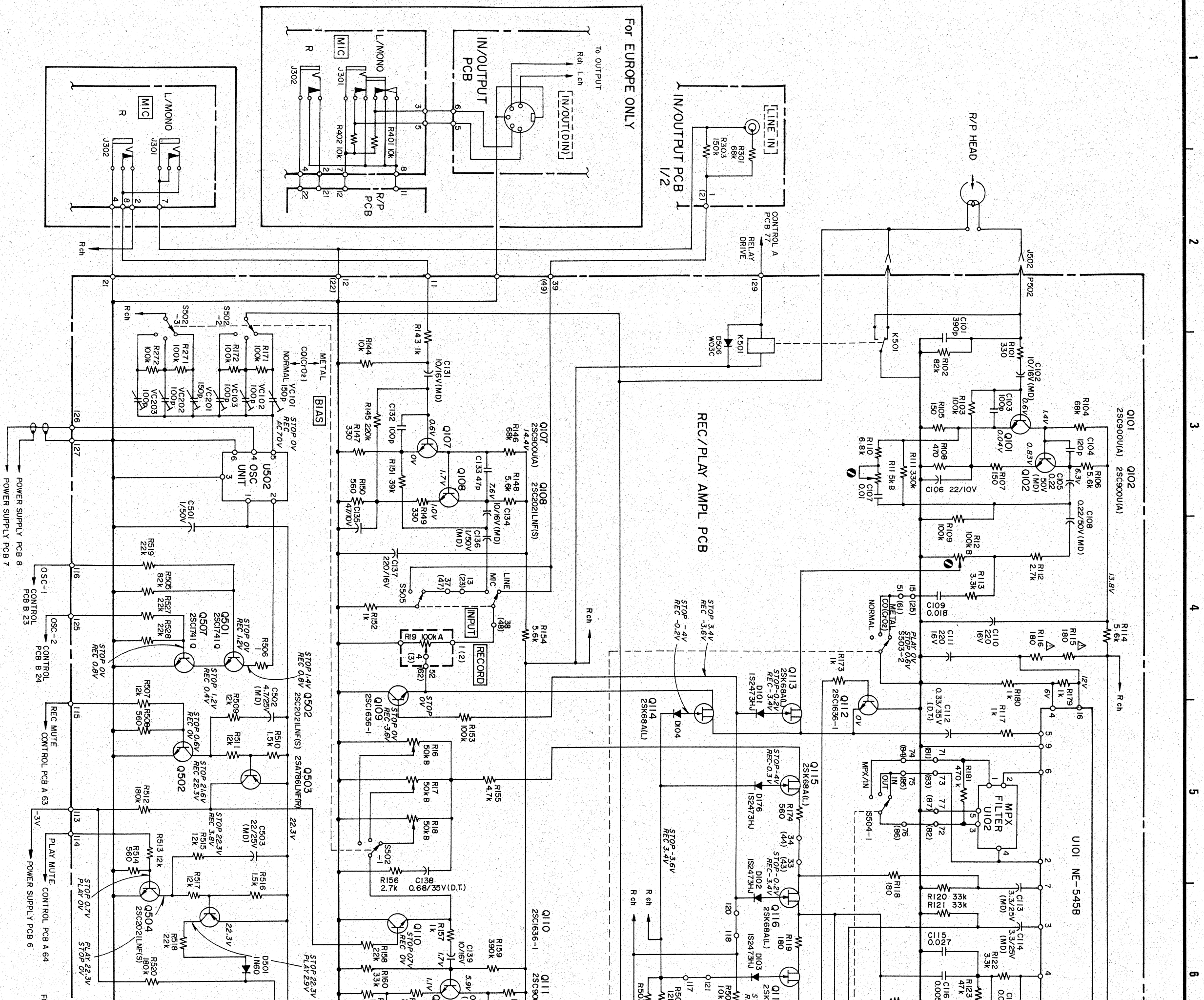
All resistors are rated ±5% tolerance ¼ watt and
of carbon type unless otherwise noted.

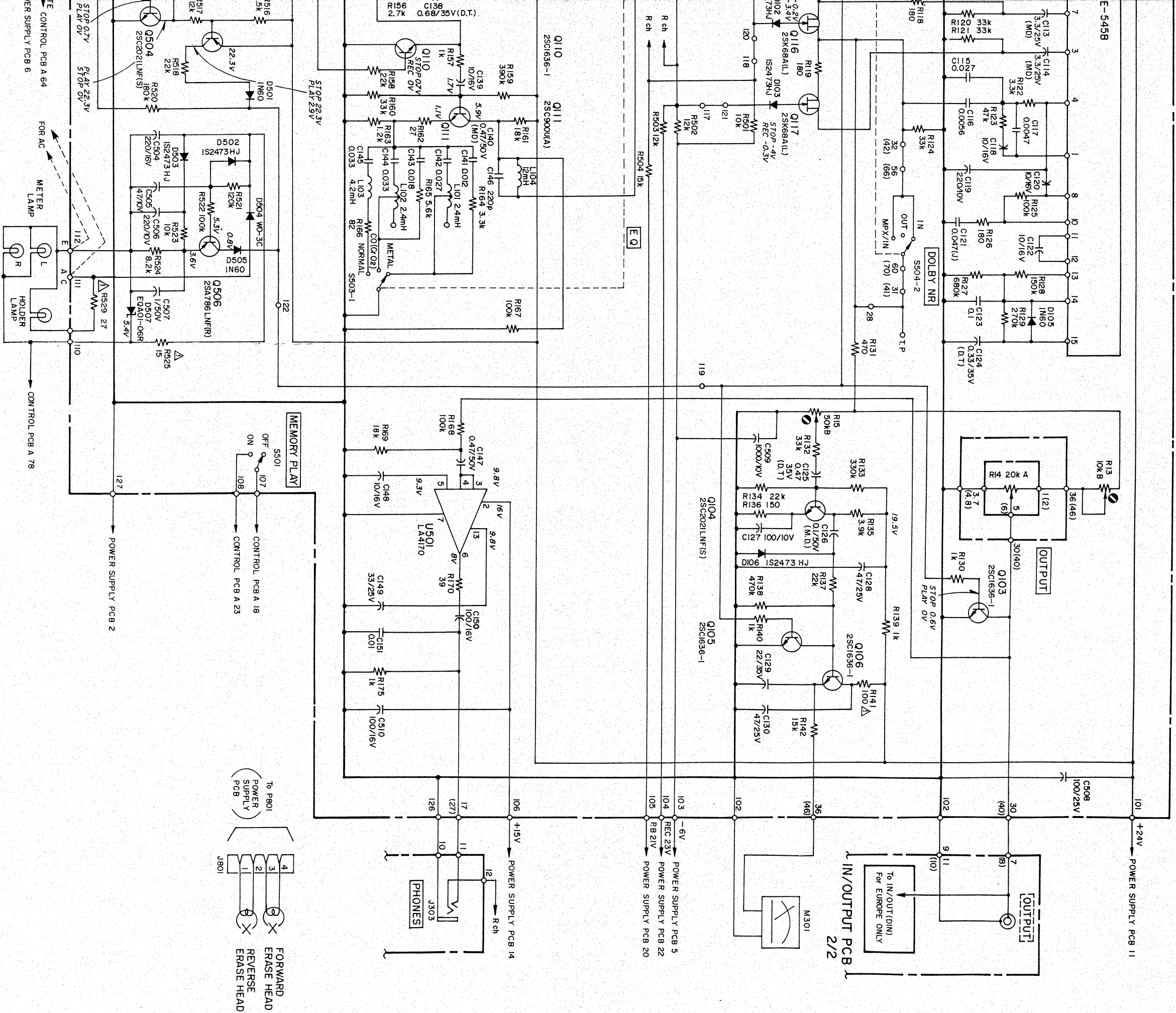
R801	△ 5052058000	1.5 ohm 5W Cement (JAPAN, G. EXPORT, EUROPE, U.K.)
R801	△ 5183953000	1.5 ohm 3W Fusible (U.S.A., CANADA, AUSTRALIA)

X-BOX



- NOTES**
1. ALL RESIST
 2. RESISTOR V
 3. Δ PARTS M
- COMPONENT
COMPONENT
EXACT REPR





CX-650R

Stereo Cassette Deck

REF. NO.	PARTS NO.	DESCRIPTION
R802~R804	5181506000	10 k ohm
R805	5181490000	2.2 k ohm
R806	5181498000	4.7 k ohm
R807	5181490000	2.2 k ohm
R808	5181498000	4.7 k ohm
R810	5181502000	6.8 k ohm
R811	5181490000	2.2 k ohm
R812	△5052709000	150 ohm 1W Non Flammable
R813	5181484000	1.2 k ohm
R814, R815	5181502000	6.8 k ohm
R816	5181482000	1 k ohm
R817	5181466000	220 ohm
R818	5181506000	10 k ohm
R819	5181512000	18 k ohm
R820	5181498000	4.7 k ohm
R821	5181522000	47 k ohm
R822	5181458000	100 ohm

CAPACITORS

C801	5173084800	Elec.	1000 mfd	50V(USM)
C802	5173089800	Elec.	2200 mfd	25V(USM)
C803, C804	5173084800	Elec.	1000 mfd	50V(USM)
C805	5173048800	Elec.	100 mfd	50V(USM)
C806	5172992800	Elec.	1 mfd	50V(USM)
C807	5173083800	Elec.	1000 mfd	35V(USM)
C809	5173082800	Elec.	1000 mfd	25V(USM)
C810	5173072800	Elec.	470 mfd	16V(USM)
C811	5170302800	Elec.	2200 mfd	16V(USM)
C812	5173630800	Elec.	0.1 mfd	50V(MD)
C813, C814	5173044800	Elec.	100 mfd	10V(USM)
C815	5172244000	Ceramic	0.047 mfd	25V
C816	5173104800	Elec.	1 mfd	50V(USM)
C817	5173156800	Elec.	22 mfd	16V(USM)

MISCELLANEOUS

R809	5053446000	Var Res., Semi-fixed; 1 k ohm - B
K801	5061144000	Relay, G2U-113P
	5033295000	Tube, Insulating
	5033291000	Plate, Insulating
	5122128000	Connector Plug, 4P

MACHANISM PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	5158139001	PCB Assy
	5157139000	PCB
TRANSISTORS		
Q910, Q911	5145091000	2SC945AK
DIODE		
D910	5143316000	W03C

REF. NO.	PARTS NO.	DESCRIPTION
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CARBON RESISTORS

All resistors are rated $\pm 5\%$ tolerance and $\frac{1}{4}$ watt unless otherwise noted.

R910~R912	△5181986000	33 ohm	$\frac{1}{4}$ W	Non Flammable
R913, R914	5181514000	22 k ohm		
R915	5181488000	1.8 k ohm		
R916	5180066000	220 ohm	$\frac{1}{4}$ W	

CAPACITORS

C910~C912	5055949000	Elec.	47 mfd	50V(BP)
C913	5055935000	Elec.	10 mfd	25V(BP)

MISCELLANEOUS

CN910	5122136000	Connector Plug, 12P (White)
CN911	5122134000	Connector Plug, 10P (White)